COAL AGE

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True Ambition

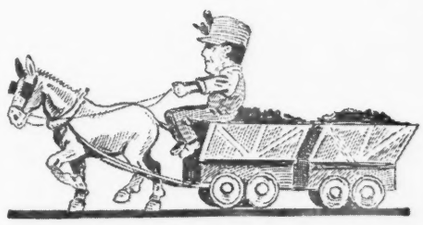
By Berton Braley
Written Expressly for Coal Age

THERE are plenty of maxims about success
And they're most of them good to know;
They preach the gospel of toil and stress
And of keeping alert, aglow.
But this is the motto that's best unfurled
For the youth of the land to scan,
"I have my work to do in the world,
And I'll do it the best I can."

This is the motto that's best unfurled—

It may not bring you to wealth or fame
Or the cheers of the fickle mob;
But it means you're certain to "play the game"
And tend to your daily job.
And though no wreath on your brow be curled
You'll be one of the worth-while clan
Who have their work to do in the world
And do it the best they can.

And whether you're trapper or district supe
Or miner or engineer;
Or whether you sit in the pay clerk's coop
Or a mule train's yours to steer,
Make this the slogan that you've unfurled
And hold to it hard, young man,
"I have my work to do in the world,
And I'll do it the best I can."



Or a mule train's yours' to steer—

I should like to rule over men and things
As the greatest of leaders do;
But whatever fortune the future brings
I would like to have this true,
That men will say, as the dirt is hurled
On my coffin, "He made good,
For he had his work to do in the world,
And he did it the best he could."

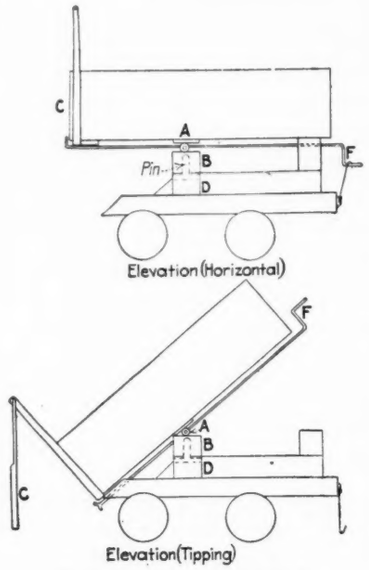
Ideas and Suggestions

All-Around Tilting Dump Car

By J. F. K. Brown*

Those who have done prospecting in districts far from shops, and where material is hard to get, often have had reason to condemn in violent language material that had been sent out by arm-chair purchasing agents and office managers with no knowledge of existing conditions. Frequently, too, when these troubles have been most embarrassing there has been nothing available to use in place of the inadequate apparatus, and nothing wherewith to build new equipment.

My memory goes back to one incident that occurred on a prospect that was 30 miles from the nearest railway station. I needed a lot of equipment, and among other things I had on order were two cars for the dump. In my requisition I had specified small self-tipping cars. Much to my disgust and that of all concerned, the purchasing agent, with a sublime disregard of my requirements, sent out two brand new coal cars capable of holding about a ton of coal each and provided with fixed ends and no doors. When used for rock work on the dump it took the combined effort of the entire surface force to move them along the track; and as for dumping them, that was an impossibility without a crane or lifting tackle. What we wanted was a small car that could be handled and dumped by one man, even though it would be necessary to make many trips to and from the ore chute.



THE CARS AS FINALLY CONSTRUCTED

It was finally decided that a new car must be built. Since there was neither iron nor a set of wheels upon the ground, both had to be secured from the cars sent out and accordingly they were set on fire and completely burned. From what was left after the holocaust the car shown in the accompanying illustration was made, which served the purpose well. It proved handy to move, was easily dumped either forward or sidewise, and did not carry enough material to make its handling, in the event that it went off the track, an impossibility.

The car was built high and was hinged at *A* to the block *B*. *B* in turn swivels upon an iron or hard-wood pin fastened to *D*, allowing the body to rotate through a complete circle. The door at the front *C* is kept closed by an iron rod that runs through to the back end, terminating in a handle *F*. A short iron hook fastening over this handle and attached to the bottom frame served to counteract any tendency of the car to overbalance at the front end during loading. The surface between the blocks *A* and *B* was greased.

In handling, provided that the loading was fairly equal, the car proved quite adaptable. Knocking off the iron hook at the back enabled the car man to swing the body of the car to any side he pleased. He then turned the handle *F* and up-ended the back of the car, allowing the rock to rush through the door. Bringing the car body down to the horizontal position also brought back the door at the end to the vertical, when a turn of the handle again fastened the catch at the foot of the door, making the car ready for another load. The car stood quite a deal of hard usage, but as it was made without much fancy trimmings or metal work it was easily repaired in a country where every man could handle an axe to some effect.

*Sydney, N. S.

How To Waterproof Drawings

A few methods for waterproofing drawings were noted by F. W. Salmon, in *Engineering News*, Nov. 30, 1916, all of which are useful and satisfactory.

A. Give the drawing several light coats of white shellac dissolved in a grain alcohol, letting each coat dry before the next is applied. Orange shellac and even wood alcohol may be used; but I much prefer the "white" or bleached shellac, and I object to the wood alcohol because of its injurious effect on the eyes.

B. Give the drawings several light coats of "Zapan" varnish, which, I understand, is made of scrap trimmings of clear sheet celluloid dissolved in acetone and is produced by several Eastern chemical factories and firms manufacturing celluloid articles.

C. When a heavier protective covering is desired than A or B will provide, the drawing may be made wet with the thin celluloid varnish and pressed down evenly on a sheet of thin sheet celluloid, then allowed to dry. This process gives a beautiful clear mounting with 0.01 in. of celluloid on the face.

D. Drawings may be made waterproof with paraffin wax, which is applied hot (melted) with a flat bristle brush. The drawing is then put between two sheets of blotting paper, and a hot (electric) sad-iron is passed over the upper blotter, thus causing the paraffin to be distributed more evenly and the surplus to be absorbed by the blotting paper. The blotters must be removed before they cool. If the wax is thick and white over any part of the drawing or print, sponge it off with benzine.

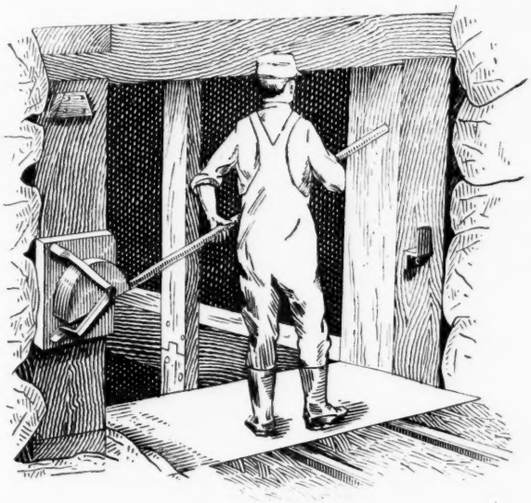
E. Drawings may be paraffined by dissolving the paraffin wax in benzine and then thoroughly painting the drawing with this liquid or passing the drawing through a bath and hanging it up to dry.

Some of the solvents mentioned are very inflammable and even explosive, so all open lights should be kept away from them. Sometimes they affect certain people injuriously; accordingly, such work should be done only in a well-ventilated room, with a fan to keep fresh air moving.

Simple Shaft Gate at Junction Mine, Warren, Ariz.

At the Junction shaft of the Calumet & Arizona Mining Co., Warren, Ariz., a shaft gate is used that is simple and cheap and has an inherent tendency to stay shut when it should be shut and to stay open when it should be open, says the *Engineering and Mining Journal.*

The gate consists of a piece of 1½- or 2-in. pipe on one end of which is a semi-circular section of cast iron pivoted as shown. When the gate is closed, the weight



A SIMPLE SHAFT GATE

of the pipe has a greater moment-arm than the counterweight and it naturally stays closed. When the gate is lifted about two-thirds of the way up, the center of gravity changes so that the counterweight tends to keep on rotating and after the pipe passes the vertical the moment of both pipe and counterweight act together to hold the pipe against the stop. A plate is used on the center post to give a bearing, and the iron straps support the bearing pin and provide a guide for the counterweight so that the far end of the gate never misses the clip and falls down. It is a clever gate.

Solderless Copper-Wire Splice

Small jobs of line extension or repair work are expensive and difficult, and it is often impossible, at the time, to solder the joints. If the wires are carefully scraped and the joint made a good length and tightly twisted, then wrapped with tinfoil before being taped, the result is almost as good as if soldered.

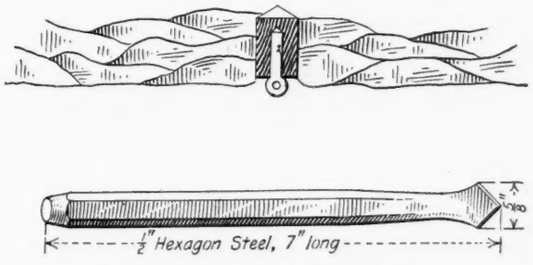
If heat is not applied to a joint until the solder is thoroughly worked into all the crevices between the wires, the flux will remain and cause corrosion and render the joint worse than if no attempt had been made to solder it. A good wrapping of tinfoil excludes moisture, and the wires will remain bright.—G. E. Miles in *Power.*

A Light Spad Drill

By W. S. Herbert*

The instrument and process here described are possibly not new, but they may be of interest to many engineers who do underground surveying in mines having a sandstone top.

A hand drill for drilling spad holes is apt to be heavy and cumbersome, and carrying it about through the



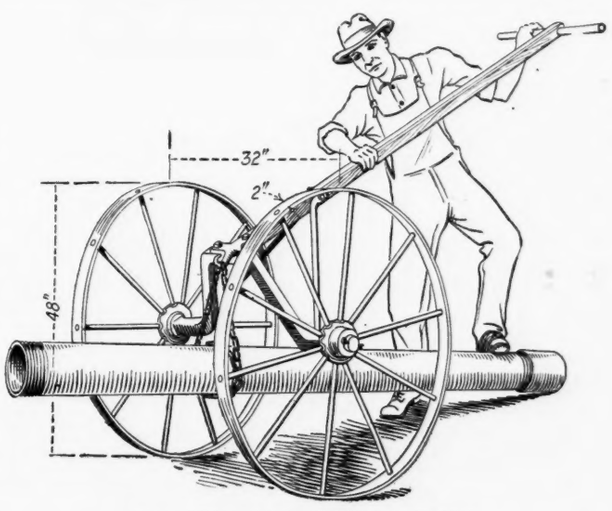
THE DRILL AND A SPAD HOLE

mine requires much time and energy. A ⅝-in. pumper drill, similar to the one shown herewith, and a hammer accomplish every purpose. By their use a hole may be quickly drilled into which a ¾-in. wooden spad plug may be driven. The drill is light and can readily be slipped into the pocket, so that but little effort is exerted in carrying it about.

Handy Pipe Cart

By H. C. Elkins†

The illustration shows a handy cart for conveying pipe or similar material in the mine. This is particularly use-



THE PIPE CART IN OPERATION

ful in places where pipe must be moved by hand and is too heavy to be easily dragged or carried.

The principle employed in this cart is old, as similar devices have long been in use on the surface. Its construction is simple, however, and the materials employed are inexpensive. Any mine blacksmith can build one.

*Star Junction, Penn.

†Star Junction, Penn.

The Tonnage Available--II

By J. F. K. Brown*

SYNOPSIS—In horizontal outcropping coal beds, much may be learned from an examination of the outcrop. This is less true if the seam is inclined or vertical, while if the outcrop is inaccessible, boring must be resorted to. Loss in preparation varies widely with the market served; loss in extraction varies with the method of mining followed. What might at first appear economic extraction may eventually prove to be a decidedly extravagant method of operation.

In the case of inclined or nearly vertical seams, the information obtained from an examination of the outcrop cannot be nearly so reliable as that acquired from seams that occur in a horizontal position. The weathering action in such cases is much more pronounced and extends to a greater depth, owing to the natural circulation of underground waters in the coal and in the adjoining strata. The depth to which this action is carried is variable, the governing factor being the natural drainage level of the country.

The point of change from the weathered to the unweathered coal is commonly indicated by the disappearance of the brown iron stains from along the cracks, slips or breaks of the seam, and replacement by the white films of carbonate of lime common in most seams. These brown stains are caused by the circulating water replacing the lime with iron carried in solution.

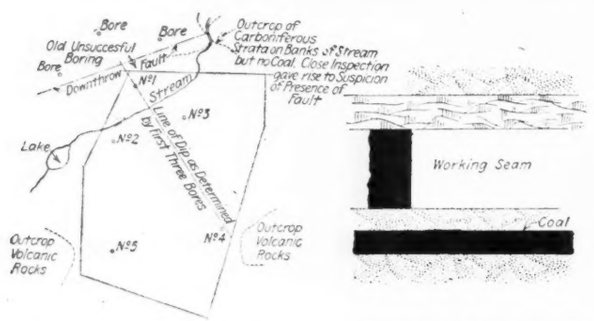
Where the coal seams in any area occur in such stratagraphic conditions that they cannot be examined at the outcrop by exact inspection, the only remaining available source of information is through boring. Fields that are so placed that ascertaining their extent and qualities by boring is necessary thus cost more to prove and develop.

There are two cases to consider—those fields which show one edge of the outcrop, as in inclined seams, and those areas which consist of more or less deeply buried beds. In the inclined-seam areas boring is resorted to mainly to ascertain the continuation of the beds to the dip, while providing as much information about the condition there as possible. In the buried fields it becomes necessary to ascertain whether the coal beds are there at all. Consequently, in this latter case the amount of boring to be done is considerably in excess of that necessitated where it is only the dip continuation that has to be explored.

In dip seams and like areas one single hole may be sufficient. If the strata are regular, all the needed information will thus be provided. Local troubles may exist, but these may be, and generally are, such that boring could not possibly reveal them. Only actual operation will show up their existence, or otherwise.

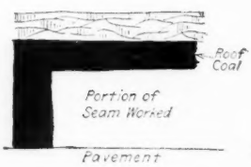
On the other hand, should the drill hole results be adverse—say, for example, the thickness below the normal—another hole will be required either to the right or left of the previous one and preferably not on the same assumed strike. If decreased thickness was shown in the first hole, we are justified in considering the possible chance of some local feature being the cause of the adverse results. It is desirable to know whether this is actually the case or whether there is in reality a decreased thickness to the dip.

Unsatisfactory results from one hole should not be considered conclusive, but if the first hole put down was satisfactory we would hardly be justified in imagining the possibility of marked variation in thickness elsewhere and go searching for this with a drill.

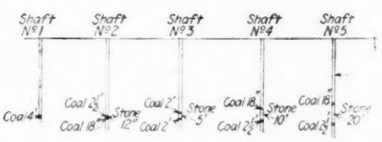


UNKNOWN FIELD WITH DIFFICULT BORING PROBLEM

PORTION OF SEAM LOST THROUGH NATURAL UNWORKABILITY



NECESSARY LOSS IN COAL LEFT IN ROOF



DIVISION OF COAL SEAM ACROSS FIELD; PARTING INCREASING IN THICKNESS

In the case of the buried field the information already at hand is much more fragmentary. This is perhaps not the case in those fields that are well developed and where the area is surrounded by existing workings. An inspection, wherever possible, of the plans of operating mines and the geological sheets of the district will reveal much data that will do away with the necessity of boring. On the assumption, however, that the field in question is largely untouched, it will be necessary to bore in order to provide complete information on thickness, conditions of roof and floor, the dip of the seams and the quality.

Thickness of coal, roof and floor conditions are ascertained in regular fashion by all the bores put down, but to get the correct dip requires at least three holes. Depending upon whether it is suspected that the strata are regular or irregular, so will the distance apart of these three bores vary. If at all regular, the three drill holes could be arranged in any triangle with about equal

* Sydney, N. S.

sides, so as to cover the entire field; but it can easily be seen that there must be conditions, such as long slow rolls, which would cause these results to be highly inaccurate and erratic.

It is therefore more desirable, where there is absolutely no information, to place these three drill holes fairly close together and, if possible, so that one side of the triangle is parallel to the supposed or imagined line of strike. On the base so provided another hole to the dip side would prove that part of the field and give additional information as to the rate of dip itself.

This arrangement, where it can be carried out, forms the most economical method of locating the needed boreholes. If it so happens that the apex of one of the triangles points toward the dip, the succeeding drill holes to that side will not give quite the same amount of information; and in order to obtain greater accuracy and knowledge it would be necessary to place one additional drill hole to the left or right of the dip line of the field, which in turn might necessitate another on the opposite side.

Careful leveling should be undertaken in connection with drill-hole work, and all positions must be correctly recorded. Above all, an exact record complete as to the color and the characteristics of the strata passed through, should be properly kept. The borehole record should not merely say so many feet of strata to the coal and the thickness of the seam. Every piece of information obtained during the operation is valuable, and nothing is more exasperating for a mining company than to find at some subsequent period that a record of the strata passed through has never been taken, or that the position of the bore has been lost.

All the information is there in the first place and should be carefully and correctly tabulated. Thousands of dollars have been spent and wasted in a search for this once easily acquired knowledge. Even Government records are rendered useless in some countries by such incomplete methods. For example, the records of the boreholes may be correct, but their actual positions may be unknown; consequently, an engineer at some later stage is absolutely unable to ascertain whether the coal mentioned in one bore is the same as that mentioned in another, or what relation they bear to each other. A plan also should accompany each drill record.

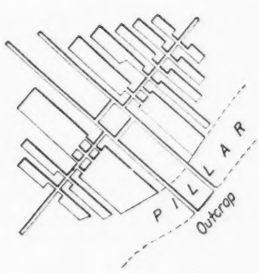
There is only one method of drilling really suitable to coal work. Either the diamond or calyx drill may be employed, but in either case it should be something that will produce a good-sized core. Taking into account the relative friability of coal strata, the best results will be obtained by means of a 6-in. drill at least, or something similar. Two-inch drill holes bring in many coal-strata results that are little better than those which would be produced by churn drilling. The larger sized drill gets a core that can be satisfactorily and accurately examined, and a sample of the bed itself that can be readily analyzed.

The only place where the use of the churn drill in coal lands could be considered satisfactory would be in those holes which are put down to follow the line of the outcrop under heavy surface. Extraordinary as it may seem, a word might be inserted herein to the effect that the proper season for drilling in moderate and arctic climates is in the summer, and in hot climates that period of the year which means health and water. This statement may appear to be plain common sense, yet it is nevertheless a fact that some companies will insist on commencing work of this kind when all the natural conditions are against success.

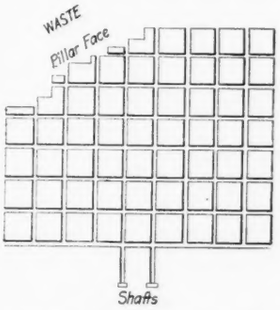
Loss in Operation

While loss in operation may be confounded with loss due to extraction in underground working, the two wastages are distinct. Extraction loss is that sustained through coal left in the mine either as being unworkable—that is, bad coal—or coal that cannot be taken out, owing to the methods of operation in use. Loss in operation can be said to be that coal which although mined is nevertheless unsalable.

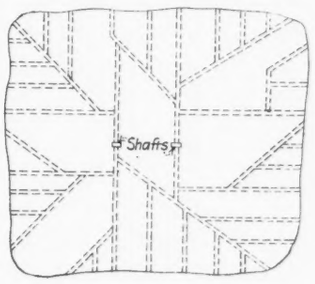
PILLAR WORKING THAT CAUSES CREEP



WORKING GIVING MEDIUM EXTRACTION



PILLAR WORKING GIVING LITTLE WASTE



LONGWALL WORKING AWAY FROM SHAFTS

This coal may either be brought to the surface and dumped upon the surrounding country, or shoveled back into the waste spaces left underground. The method of disposal is a matter of actual operation that depends upon such factors as the spontaneity of the coal in regard to combustion in the wastes and the cost of taking it out.

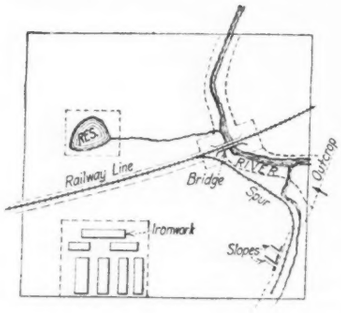
Whatever way it may be treated, the amount that is unsalable is variable, depending not only upon the quality of the coal and the method of working, but also on the state of the market. Of all of these conditions the latter is more generally the deciding factor and commonly an influence affecting the other two.

Coal markets can be considered as being of two classes—educated and uneducated. The first implies that the country is well developed industrially, that coal is relatively scarce and that consequently even the finest of the "dusts" is utilized for steam raising in modern power plants. Under these conditions the waste of small coal is really nil; it is in demand, is salable outside the mine, and the management puts up with a mixture of dirty coal and actual rubbish and coal mixed.

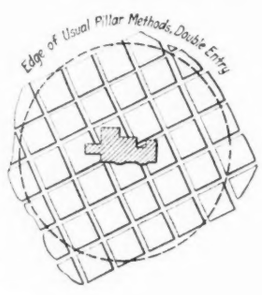
In the uneducated country where fuel is cheap, and where the boilers and all other steam-raising appliances

are therefore constructed for the use of round coal, there is little demand for small sizes. These, consequently, become a burden on the coal company, which has perforce to send them to the dump. It should also be remembered that certain seams, certain companies and certain countries dispose of their coal in the condition known as "run-of-mine," while others are compelled to pay attention to careful classification in order to obtain a salable product.

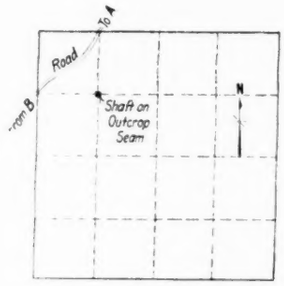
In the first case there is again no waste through production of unsalable material, while under the latter conditions the rise and fall of prices during certain periods may be the cause of inability to dispose of the poorer products. Again, other coals and other districts bring to the surface, either mixed with the coal or as part of the seam, bands of coal that are unsalable, not because of the conditions of the product, but because of their quality. These bands may be high in ash and poor in burning power. This is waste not from actual working or loss in extraction, but is loss through unsalable product.



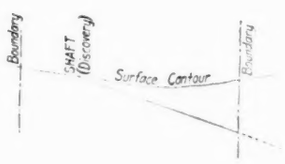
PLOTTING COAL LEFT FOR SURFACE SUPPORT



PROTECTING A PUBLIC BUILDING



PLAN OF COAL AREA IN NEW COUNTRY



PROMOTORS' SECTION ACROSS THIS FIELD

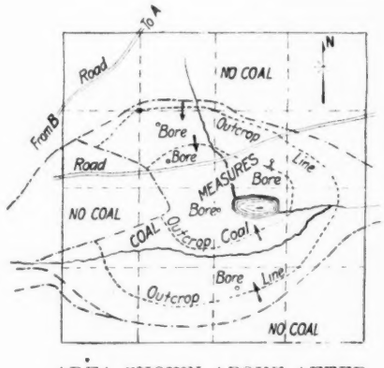
The general loss through material that cannot be sold is for all these reasons a decidedly variable quantity, ranging from nothing to as high as 40 per cent. As an illustration of this the following figures represent percentages produced at a mine where the conditions are about the average of the country in which the mine is located: Round coal, 41 per cent.; nuts, 17 per cent.; peas and duff, 14 per cent.; pickings, 26 per cent. Pickings are entirely unsalable, while peas and duff are normally unsalable and can only be disposed of when trade is extra good. The fact that there are such losses in actual operation is also important to keep in mind when investigating the prices received for the fuel produced. Under the loss due to extraction there must be considered all loss of coal that is brought about by methods of working and waste in underground operation. By the term waste is not meant the proportionately minor amount of small coal that is lost in shoveling into cars and handling in the mine, but rather the coal that, while being part of the seam, is left behind unworked; the coal that remains untouched on roof and floor, and that in pillars which cannot be afterward withdrawn. Chief among the factors that govern these losses are the condition of the seam and the methods of working.

Certain coals, as we all well know, exist under such underground geological conditions that operators, in order to work them economically, prefer to leave a band of coal at the top of the bed so as to have a steady reliable roof, this part of the seam being referred to most frequently as the "roof coal." It may vary from 6 to 18 in. in thickness.

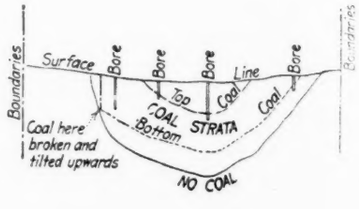
The practice of leaving coal as a roof support is followed most commonly in those thicker beds where the seam itself, or the upper portion of it, is of a stronger structure than the shale overlying the coal. With other coals, and especially those that are banded with rock and coal alternately, the same conditions react in causing a loss in one way of perhaps a rib of coal at the foot of the seam, and in other cases of a band or portion anywhere between roof and floor.

Conditions such as these belong to the question of determining the workable thickness of the coal, and loss from any such source is applicable in general to the whole of the field and becomes a deduction from the total thickness available. Caution has to be observed, for such conditions may only develop in the course of operation.

A seam at the commencing point may, for example, be considered workable as a whole although it has a band of stone somewhere in the center of the section. As the workings progress, however, this stone band may so increase in thickness as to cause the abandonment of the lower leaf of the coal. This part of the seam would then become unworkable until the stone parting had increased to such an extent that each split could be mined separately. Loss of coal which mining necessity may cause to be left on the roof is more easily measured and determined earlier in operation, and could in well-defined cases be surmised from a careful and thorough examination of the outcrop conditions where these are representative and visible.



AREA SHOWN ABOVE AFTER INVESTIGATION



ENGINEERS' SECTION ACROSS SAME FIELD

Methods of operation result also in appreciable loss of coal. Small pillars and wide rooms are undoubtedly the most wasteful of all methods. While it may seem clear to the management that although it has left only small pillars it may expect to get recovery thereof at a later stage, still during the period of waiting "creep" may make its appearance and not only cause the pillars to be sacrificed but also some areas of solid coal, in order that the progress of the "creep" may be arrested.

Longwall methods probably give the greatest possible percentage of extraction, especially those systems which break away as longwall from the foot of the shaft, where conditions are such that no shaft pillar is required. Such cases may be said to be ideal.

Isolated pillars that are left in the course of operation to protect certain underground roads, or as proper supports to railway lines, bridges, important buildings and shaft pillars, and the area that is left along the outcrop of inclined seams, are other sources of waste. All the latter areas can be comparatively easily predetermined, and the tonnage that must be deducted from the field in consequence can be calculated from an examination of any plan of the area. The amount that represents loss from methods of operation can only be estimated.

A study of the existing mines in the same neighborhood provides a good guide. The chances are much in favor of the new mine adopting the methods in vogue in the district, unless there be some extraordinary feature demanding a radical change; and from established practice a good idea can be obtained of what is the possible and probable loss. But where the field is entirely undeveloped, and actual planning cannot be undertaken, such figures as can be put down on paper have to be based on experience gathered elsewhere.

Variations in the Estimates of Engineers

There appears to be a great variation in the amount of coal sacrificed by engineers for loss of coal and unknown contingencies. I have known cases where deductions on the same area under review by men acting for investors has varied from 50 per cent. down to 5 per cent. One man was ultracautious and the other underestimated the probable losses, and yet time proved the latter to be more correct. Many men entirely neglect any losses from erosion and absence of coal and natural unworkability, contending that the first is a subject that cannot be predetermined with any reasonable accuracy and that both together are capital losses rather than questions that relate to the amount of tonnage available in the field.

This means that on this view natural unworkability can be considered a fatal objection to the commencement of operation of a coal field, and that if discovered afterward it represents loss of capital and money subscribed, but has no bearing upon tonnage available. In many ways this view is correct, but it omits such cases as badly faulted fields where workings are conducted in a series of steps, and where areas are abandoned because the faults in certain places are too close for profitable operation. It also forgets those cases where a coal unworkable here may become profitable a few miles away or less—not uncommon conditions in many areas.

Extraction in working under present-day methods can be undertaken with a loss of not over 10 per cent. and more frequently 5 per cent. Loss due to operation may range from 12 to 5 per cent., or even less. Together, these average 14 to 15 per cent. If another 10 per cent. is added to this to represent unknown conditions, there is probably attained a figure that represents the normal, and the average of conditions where no special influences or knowledge point to a readjustment of figures for greater or less loss in connection with any one particular kind of waste that might result.

Big Improvements at Hampton Roads

The Virginian Ry. has completed arrangements for the enlargement of its coal-handling facilities at Sewalls Point that will involve the investment of approximately $750,000. The new equipment will increase the maximum coal-handling capacity from 18,000 to 54,000 tons per hour. The improvements consist of a larger car dumper, scales, elevator and six new conveyor cars.

The contract for all the equipment has been let to the Wellman-Seaver-Morgan Co., of Cleveland, who will build and install the machinery. A new set of scales of 300 tons capacity is not included in the order to this firm. The changes involved will make necessary the addition of other facilities by the railroad, such as increased trackage, a new viaduct, increase of the power substation and enlargement of the yards.

A contract has also been let for the construction of four new road cars, each of a different pattern. Other cars of the type most satisfactory will be ordered as soon as possible; this is in addition to an order recently placed for 1,000 steel 50-ton road cars.

Loading at the pier will not be interfered with by the new construction going on and, even after its completion, the present method of getting the conveyor cars on the pier by means of an incline will be used to supplement the service of the new elevator. The elevator system of raising the conveyor cars to the top of the pier is similar to that in use at Lamberts Point by the Norfolk & Western Ry., and at Newport News by the Chesapeake & Ohio. The new conveyor cars are to be of 120 tons capacity instead of 60 tons as at present. They will thus be able to take the full load of the 120-ton road cars or two 60-ton road cars.

The contract calls for the completion of this work by Dec. 20, 1917. The construction work is being done under the supervision of H. Fernstrom, chief engineer of the Virginian Ry.

Other developments of interest to the coal industry at Hampton Roads include the purchase of a site for a shipyard for the Southern Transportation Co., owner of a fleet of 100 barges and tugs, largely engaged in the carrying of coal. The Malcolmsen Briquetting Machinery Co. is about to start the construction there of a plant with 100 tons daily capacity, for the manufacture of briquettes from Pocahontas coal. The Pocahontas Fuel Co. is at the head of this enterprise, and it states that the output is intended largely for export. The plant is expected to be in operation in about a year.

The "Power Department" in "Coal Age" is commencing to appear with some degree of regularity. Readers of the paper were a little slow in sending us the right kind of contributions on this important subject; however, we are now getting power articles of great interest, and we want many more dealing with this vital phase of mining.

An Interesting Dynamometer Journal-Friction Test

On Sunday, Nov. 19, an interesting dynamometer test took place at the Coalbrook colliery of the Delaware & Hudson Co. at Carbondale, Penn. The object of this test was to determine accurately the journal friction of two different types of journal boxes used on mine cars.

INTERESTED OPERATORS STANDING ABOUT THE DYNAMOMETER CAR

One type of journal box was equipped with the old-style plain bearing used at this colliery. The other box was fitted with Hyatt flexible roller bearings. Both boxes were designed and manufactured by the J. R. Fleming Co., of Scranton, Penn. The test was conducted on the main haulage track of the mine. Two trips of ten cars each were employed. One trip was equipped with the flexible roller bearings, while the other consisted of cars using the plain bearings.

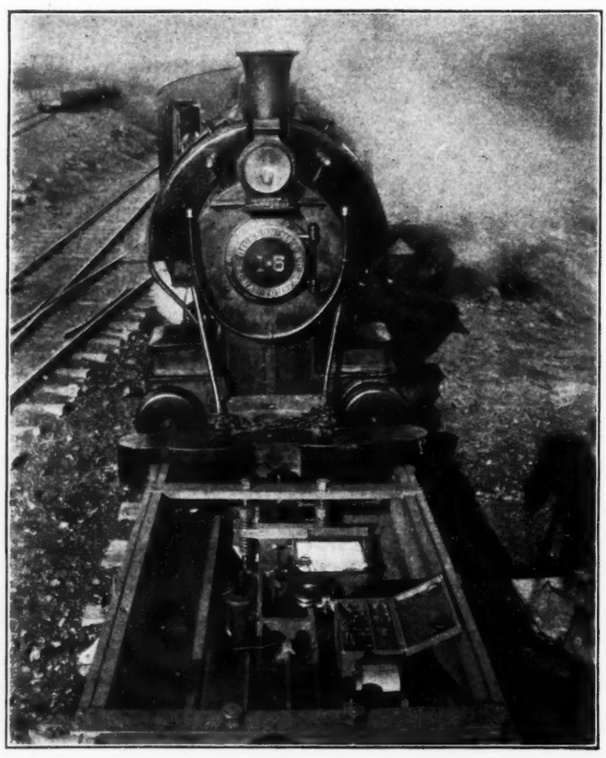
Between the locomotive and each trip of cars the Hyatt dynamometer car was placed. This car was described in *Coal Age*, of Nov. 4, and a further description here is unnecessary. The accompanying photographs clearly show the car as it appeared during the test. This car recorded the drawbar pull, the time and the speed simultaneously by different recording instruments upon the record paper.

Aside from the journal boxes, the cars employed in the test were identical. The load on each trip was also approximately the same.

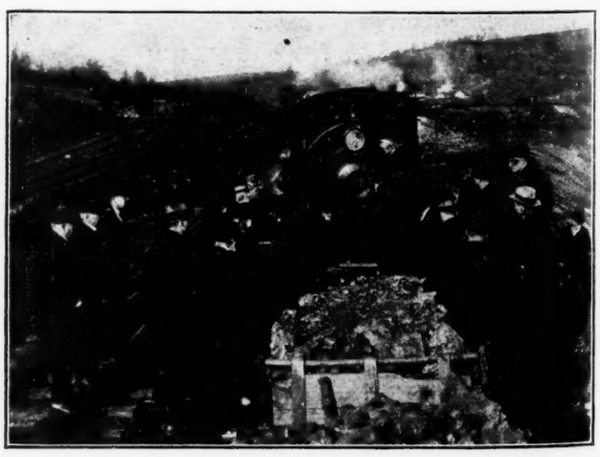
The first part of the test, consisting of recording the pull necessary to start a trip and keep it in motion, was made upon the cars with the roller bearings. The second part of the test recorded the same quantities on the trip provided with plain bearings.

The difference between the plain and roller-bearing cars was marked. It took from two to three times as much pull to start the plain-bearing cars as it did those provided with roller bearings. Also, it required approximately 2½ times as strong a drawbar pull to keep the plain-bearing cars in motion.

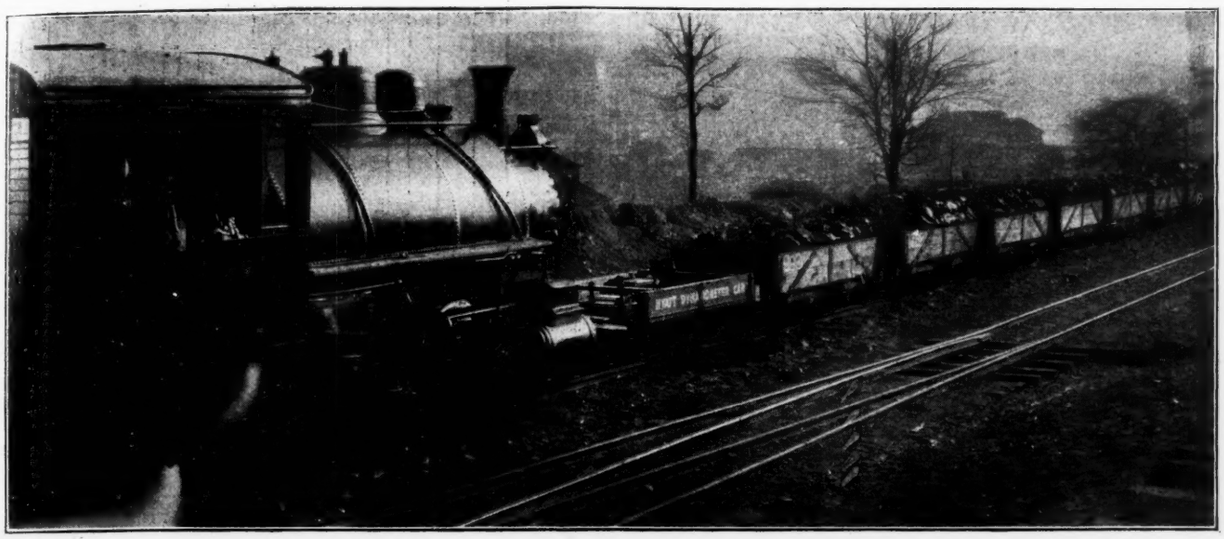
Besides the dynamometer-car test, several trials were made to determine the difference in manpower required to



THE DYNAMOMETER CAR



EXPLAINING THE CAR'S OPERATION



LOCOMOTIVE, DYNAMOMETER CAR AND TRIP

start the roller-bearing cars and those equipped with plain bearings. One man could start a roller-bearing car, while it took two, and sometimes three men to start a car provided with plain bearings. In these instances both cars were loaded to capacity.

The marked difference between the flexible roller-bearing cars and those equipped with plain bearings is worth consideration. The reduction of operating expense and the increase in production made possible by the use of roller bearings is large enough to warrant close attention from mining men. This test aroused considerable interest throughout the anthracite region, and a large number of prominent mining men witnessed it. The test was under the direction of P. B. Liebermann, engineer, for the Hyatt Roller Bearing Co., of Newark, N. J.

Recollections of a Manager

During the past few weeks, we have been carrying on an investigation to determine just what results we are getting from the money spent on sanitation and welfare work. The investigation was decided upon because one of our directors, Mr. Redding, has objected to every appropriation that has been made for that purpose and at every opportunity insists on getting something in the minutes to show that there is at least a minority vote on the board against such tomfoolery. Finally, the taunts of the reactionary became unbearable to the other members of the board, and they decided upon an investigation to be carried on without the knowledge of Mr. Redding, yet so planned that he should be one of the investigators.

Mr. Redding is a stockholder in a small company that is classed as unprogressive but a money maker; the manager of that company was invited out to one of our mines at the suggestion of our board of directors, presumably to consult with the superintendent and myself on an important matter of policy; and the invitation was given verbally to Mr. Redding to be passed on to his manager.

Mr. Redding and his manager, Mr. Rice, met me the next day at our superintendent's office, and after the conference was concluded, Mr. Redding suggested that his manager take a walk through our camp to see what we had been doing. The first thing that attracted our visitor's attention were some reinforced concrete posts around the dwellings. When he walked over to examine them more closely, he noticed that each dwelling had a garden in the rear; in one of the gardens he found a man at work planting winter turnips, and the gardener proved to be a former employee of his company.

During the conversation that followed, we learned that Mr. Rice had been trying for several months without success to induce this man to return to his old job, and naturally he asked the man why he had not replied to his letters.

The man's answer brought a smile of satisfaction to the faces of the investigating committee.

He started out by calling attention to his garden and to the general appearance of his yard. "Do you know," he said, "this company collects garbage twice a week without cost to the renters, and if a family refuses to deposit its garbage in the cans provided for that purpose, they are notified to move.

"I thought that was carrying it pretty far, Mr. Rice, when we first moved over here, probably because of the contrast to what I had been accustomed to; but when my wife learned from the company doctor that this camp escaped typhoid and several other epidemics that were all around us, and in your camp also, to say nothing of the mosquitoes and other pests, I decided I had no kick coming.

"When I received your first letter, Mr. Rice, I asked the 'old lady' what she thought about it, and she replied that she wouldn't return if you offered her the best house in the camp.

"Our kids overheard part of the conversation, and they took sides with their mother immediately; surely, they said, we would not take them to that horrid old camp where they had neither playgrounds nor Sunday school."

At this point in the conversation our plant superintendent remarked, innocently, that he understood that some of our directors objected to the amount of money required to carry on welfare work.

With malice aforethought I turned to Mr. Redding, and suggested that as he was the only member of the board of directors present, he might wish to make reply to our superintendent's inquiry.

To which Mr. Redding deliberately replied that it was not advisable to credit gossip.

Coking Coal Industry in Harlan County, Kentucky*

By J. R. Foster†

SYNOPSIS—A description of an installation of 408 ovens. Belgian type of oven was tested, but rejected in favor of the standard beehive oven. Coke from this plant was used on the record blast furnace run of the United States.

Work on the first and only coke plant in Harlan County was commenced in 1910. About one year later, July, 1911, the Louisville & Nashville completed its line from Pineville to Benham. Before the railroad was completed, all supplies from the outside had to be hauled from Stonega, Va., 35 mi. from Benham. This made material for construction very costly and hard to get, so that when the railroad was completed the construction of the plant was not far advanced.

The first ovens to be built were two Mitchel or rectangular ovens. These were constructed for experimental purposes in order to discover whether or not the Belgian type of oven would be more economical for coking Benham high volatile coal than the beehive oven. The ovens were 5 ft. wide, door 4½ ft. high, length 30 ft., crown 7½ ft. high, with 14-in. trunnel heads. Eight tons were charged per oven. The coal stood in ovens, after leveling, about 30 in. The percentage of recovery was very low, averaging 52 per cent. The grade of coke seemed to be as good as that produced by beehive ovens. As this test was unsatisfactory, it was decided to run some tests in Stonega beehive ovens, and 36,250 lb. of "C" seam coal was hauled over in wagons and crushed. The test gave the following results:

	Lb.
Amount of coal charged	36,250
Coke recovered	22,180
Loss	14,070
Per cent. of loss	38.81
Per cent. of recovery	61.19

The ash removed from the ovens, including all the small coke that would fall through the coke-fork prongs which were 1¼ in. apart, amounted to 877 lb., or 2.5 per cent. of the raw coal charged. Therefore, from these tests it was decided that the beehive method would be the most economical for coking "C" seam coal.

At first 300 ovens were built and later 108 were added, making a total of 408 ovens.

All the ovens are built on 3 ft. or greater foundation, with the battery walls constructed of cut stone from quarry. Each battery has two rows of ovens; the diameter of the ovens is 12½ ft., height 6½ and 7½ ft. and 14-in. trunnel head. The ovens are built of ring wall brick to a vertical height of 37½ in.; at this height the construction of the dome begins and continues until there is only a 14-in. opening, which holds the trunnel head. In our practice with high volatile coal we have found that the 7½-ft. oven gives the best results, because it means a larger combustion chamber, and more gases are burned inside the oven instead of escaping, so that the oven gives the added advantage of extra heat.

The coal is crushed by two Jeffrey swing hammer crushers, each of 1,500 tons capacity, the maximum size of the coal being ¼ in. It is carried from the crusher by a drag conveyor to a slack bin that has a capacity of 1,200 tons. The charging is done by two electric larries with trailers. The first charges of both 48- and 72-hr. are 5 tons and the second 48-hr. charges 6 tons and 72-hr. charges 7 to 7½ tons.

The best practice is to wait until the charge is well coked before drawing. Beehive ovens coke the coal from the top down, and until the charge is coked to the bottom the coke will have what is commonly called black butts, which break up very easily, and also coal remaining at the bottom, both causing considerable loss of yield. Another reason why the charge should not be drawn before it is well coked is that the oven bottom does not get red hot, and cold bottoms cause a decreased yield per oven. If two incomplete charges are drawn in succession, it is impossible to coke the next charge in the allowed length of time.

All ovens are drawn by hand and the coke is loaded by hand. A puller's tools consist of door hook, beaver, watering bar, hose and fork.

A problem that up to this time we have not been able to solve is the elimination of the loss caused by the coke burning up between the trunnel head and the door. This is more pronounced in 72-hr. than in 48-hr. charges. The loss can be practically eliminated by mixing a large per cent. of high ash coal, but this method reduces the value of the coke.

The analysis of "C" seam coal is as follows:		The analysis of "C" seam coke:	
Moisture	3.02	Volatile matter	1.00
Volatile matter	38.78	Fixed carbon	94.00
Fixed carbon	58.91	Ash	4.50
Ash	2.27	Sulphur	0.50
Sulphur	0.652	Phosphorus	0.003
Phosphorus	0.003		
B.t.u.	14,554		

The theoretical yield in coke for one ton of "C" seam coal is 61.18 per cent. For the year 1915 the Benham plant averaged 61.43 per cent., or 0.25 per cent. above theoretical yield. This was partly due to all the volatile matter not being expelled, and the carbon deposit on the upper portion of the coke, due to extreme heat, breaking up the rich hydrocarbon gases before they came in contact with the oxygen in the air.

The Wisconsin Steel Co.'s plant at South Chicago consumes the entire output of the ovens except about 100 tons per month shipped to outside parties. The record run made by the blast furnaces of America was made by the Wisconsin Steel Co. and the furnace that made the record used Benham coke exclusively.

Coke Breeze

The preparation of the coke breeze for market has been as hard a problem to overcome at Benham as it has been at most beehive coke plants. The percentage of raw material, cinder and small pieces of brick caused by daubing the doors is so great that the consumer almost always makes a complaint.

Our present screening plant consists of a revolving screen driven by a motor. This screen is divided into

*Paper read before the Kentucky Mining Institute, Louisville, Ky., Dec. 9, 1916.

†Engineer, Wisconsin Steel Co., Benham, Ky.

three sections. The first section has ½-in. mesh, which eliminates the ash and dust. The second section is of ⅞-in. mesh for pea coke. The third section is of 1⅜-in. mesh for separating chestnut coke. The stove coke passes out at the end of the screen. Each of these sections is over a bin that holds one carload.

The percentage of each size:

	Per Cent.		Per Cent.
Ash	62.7	Chestnut	6.0
Pea	30.5	Stove	0.8

At present, while there is an acute fuel shortage, the stove, chestnut and pea coke are in big demand. Stove coke is used principally for metallurgical purposes, while the pea and chestnut are mostly used for domestic fuel. The workable coking coal seams in the Benham spur are as follows: A, or Harlan seam, elevation about water level; B seam, 110 ft. above A seam; C seam, 40 ft. above B seam; D seam, 75 ft. above C seam; high splint, 1,300 ft. above drainage.[1]

These seams average from 3 to 6 ft. All make a good grade of coke except D, which is too high in phosphorus for Bessemer practice.

[1]Through an obvious typographical error the paper published by the institute gave the units of measure in this paragraph as inches instead of feet, which we have taken the liberty to correct. A detailed description of the geology of this field will be found in "Coal Age," Vol. 3, p. 796.—Editor.

New Electrical Device for Detecting Gas*

By C. M. Means†

SYNOPSIS—Two glowers, one catalytic and the other noncatalytic, are placed side by side in a suitable glass and gauze container. These are arranged in series and energized from a battery. In the presence of gas one increases in brilliancy while the other is dimmed.

The constantly increasing use of the miners' electric lamp has created a demand for a device other than the ordinary flame safety lamp for detecting the presence of explosive or inflammable gas. The portable electric lamp is replacing the flame safety device because of the increased and better illumination, and is supplanting the open light because of increased safety.

The portable electric lamp will not detect the presence of gas, and it is the present practice to use the ordinary flame safety lamp when testing therefor. The device under consideration is intended to be used in testing for gas in connection with electric lamps. It consists essentially of two glowers connected in series and placed in a vertical position side by side. These glowers are inclosed with glass and gauze, the glass being for observation purposes and the gauze to allow free circulation of air or gas and still prevent the communication of flame to the outside.

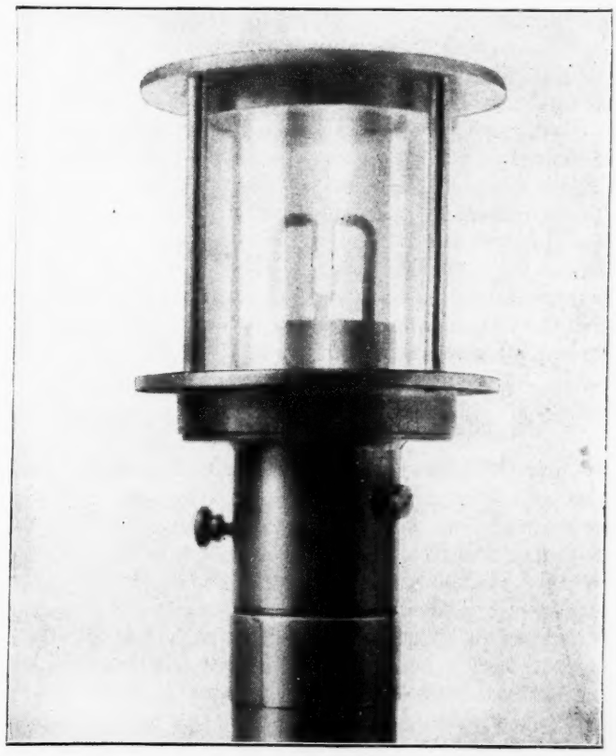
The device is not at all likely to ignite gas even if the glass is broken, as the temperature of the glowers cannot be raised to the ignition point in a mixture that can be ignited. This indicates the possibility of making a perfect safety device that will not ignite methane under any circumstances.

Owing to the shape of the detector it can be placed close to the roof, where gas is most likely to be found. It requires no adjustment and should be equally reliable under all conditions of air.

The determination as to whether or not gas is present is made by comparing the relative brilliancy of the two glowers. In case gas is encountered one of the glowers brightens and the other dims.

When used in connection with the regular battery lamp, and using energy from the same battery, it can be made extremely small. In practice it may be found that it will not be advisable to attempt the use of a small size.

Exact percentages of gas cannot be ascertained with the device as shown in the accompanying illustration, but this can be approximated with a little practice. It is entirely feasible to use this principle in the form of a laboratory outfit when percentages as low as ¼ per cent. can be read. This implies a sensitive arrangement, which would have little practical value in the average coal mine unless a simpler arrangement than is now apparent can be evolved.



THE NEW GAS DETECTOR

The principle employed in the device is the use of one glower that will give catalytic action when in the presence of gas and another arranged in the same plane which

*Paper read before the Coal Mining Institute of America.
†Consulting Engineer, Pittsburgh, Penn.

will not. The glower possessing catalytic properties and heated to a proper temperature by some external means will increase in temperature when brought in contact with methane. The glower which does not possess this property is raised to the same initial temperature, but dims when brought in contact with gas, due to the increased resistance of the other glower. So long as the two are in air they remain at the same temperature and glow alike. In the particular device under consideration both glowers are made of the same material, but they have undergone a treatment that renders one highly catalytic and the other noncatalytic.

When properly operated, absolutely no difficulty is encountered; but by allowing the glowers to be energized for a period of time in mixtures containing high percentages of gas, they may be volatilized. By high percentages of gas is meant 20 per cent. methane or more. However, if properly operated there is no occasion for trouble, even at these high percentages, since even if the temperature of the glower is high, the limit of explosibility has been passed.

The energy required to operate a detector of this type is small, and sufficient current can be taken from the ordinary lamp battery without appreciably shortening the hours of burning. Dry batteries can be used to supply the necessary energy, but owing to their variable voltage characteristics, it is necessary to insert a resistance in series so as to maintain a uniform voltage at the glowers.

The operation of this detector is somewhat different for the various gases, and it has been found advantageous to operate the glowers at a slightly lower temperature in a gas containing free hydrogen, such as ordinary manufactured or illuminating gas. The really new feature is the treatment to which the glowers are subjected. In one case this is such as to render one glower highly sensitive to the action of methane or any inflammable gas, while the other is not in any way affected by it, although both are in intimate contact therewith. The principle employed is well known, and the results attained are due to the treatment of the glowers. There is every indication that the device will be of material value in detecting the presence of gas and should be a valuable adjunct to the present portable electric mine lamp.

A Neat Window Display

During "Electrical Week," Dec. 2 to 9, a Denver coal firm installed in its show windows an attractive display consisting of a miniature railroad track on which ran an engine with three cars attached. The track was oval-shaped and had a run of 15 ft. in each direction; the cars were loaded with three different kinds of coal and bore placards setting forth the prices and the purpose for which each kind of coal was best adapted. Within the oval formed by the track was a papier-mache facsimile of the entrance to the company's principal mine, with the men's quarters and a large dining-hall in the foreground. As the train disappeared behind this replica for a moment, reappearing as if emerging from a tunnel in the hills, an automatic device blew a tiny whistle and changed the position of a semaphore arm, exposing the words "Another train load just arrived." Electricity was applied to the engine by the third-rail system.

A half-dozen neatly framed 8x10-in. photographs showing the interior of the mine, machinery and the men at work were distributed across the window front. From dusk until midnight an electric flasher spelled out the firm's name. The headlight on the engine and varicolored lights set so as to reflect on the moving train enhanced the artistic effect.

IN LIGHTER VEIN

Knew Where He Was

There is a man down in Birmingham, Ala., who is employed by a big industrial concern to keep its several thousand employees in good humor. Of course, he has an official title, but that is really what he does. Naturally, he has a fund of good stories. Among the number is this true one, which he tells to illustrate the importance of knowing one's ground even under difficult circumstances.

An old negro track-walker on the Cincinnati Southern Ry. was held up one day by three desperadoes, who had just robbed a train a half hour before.

True to racial instinct, the old negro ran, and despite a fusillade of shots fired at him, cleared one or two barbed-wire fences and got away whole.

The robbers were captured, and at the trial Uncle Zack was the state's star witness in proving their identity. He told of how he was held up at the point of a gun with a mouth like a funnel, how he ran and was shot at repeatedly; how by doubling his resolution he cleared the wire fences and finally escaped. He identified the robbers as the men who shot at him.

The lawyer for the defense took Zack and made him retell the whole story. He made him admit that after he started to run he never looked back. His flight over the fences was vividly recounted. Finally, to utterly rout the old negro and discredit his whole tale, the lawyer for the defense shouted at Zack:

"You say you ran?"

"Yessir, I sho' did," replied Zack.

"You heard shooting, but you never looked back?"

"Yessir, I hee'rd de shootin' all right, but I wuz too busy goin' to ever look back."

"You say they were shooting at you?"

"Yessir, dey sho' wuz."

"Now, isn't it a fact," shouted the lawyer, "that these men you say you heard shooting were firing in the air?"

"No, sir," said Zack; "dey wuzn't, cause if dey had been dey would have hit me sho', cause dat's whar I wuz most uv de time."

Recent Legal Decisions

Operator's Liability to Employee's Substitute—A coal operator who customarily permits miners to temporarily substitute outsiders in their own stead stands in the relation of employer to the substitutes, so far as concerns liability for injuries sustained by them while at work. (Oklahoma Supreme Court, Ghinelli vs. Kali Coal Co., 155 Pacific Reporter, 606.)

Loader's Reliance Upon Assurance of Safety—A loader working under the supervision of a miner is not precluded from recovering damages for injury resulting from a fall of slate from a roof over his place of work, although he had misgivings as to the safety of the roof, if it appears that he relied upon the superior judgment of the miner and that the danger was not so obvious that an ordinarily prudent man would not have remained at work under the circumstances. (Kentucky Court of Appeals, Setzer vs. North East Coal Co. 183 Southwestern Reporter, 553.)

Mine Inspectors' Institute of the United States of America*

SYNOPSIS—Need of extending the work and influence of the Institute and enlisting the co-operation of metal mine inspectors. Efforts to decrease the mine-accident rate not as effectual as could be desired. Need of better classification of causes of accidents. Inadequacy of mining laws shown by illustration comparing two mines operated by different managements in the same field.

Fellow Members of the Mine Inspectors' Institute of the United States of America:

I esteem it not only a great privilege but an honor to once more have the opportunity of meeting with you as a member of this organization. Although, as you may know, I am no longer in the active work of an inspector, I am still in full sympathy in the great movement that may be summed up as greater safety in our mines.

It was with much regret that I had to deny myself the privilege of meeting with you last year at St. Louis and, as I did not have the opportunity then, I wish now to express my high appreciation of the great honor that you conferred upon me, in selecting me at that time as your president. I have felt, however, that it might have been better for our Institute, if a man had been selected for this high office who was to remain more in touch with the active work of mine inspection. Nevertheless, from my past experience, I feel that I am and always will be in full sympathy with the active inspector, both in respect to his ambitions and the solution of his problems.

From the previous meetings of this Institute that I have attended, I have returned home feeling that I had increased my knowledge of the difficult problems of mine-inspection work, and that I was better fitted to more successfully carry on my work for the coming year; and I think that no inspector can attend one of our meetings and conscientiously participate in the proceedings, without going back a more capable and efficient officer and a better man.

Appeal To Extend Influence of the Institute

While the membership and influence of this Institute is such as to give encouragement to every member, I feel that it should be much greater. Mine-inspection work, taken in the truest sense, is a highly specialized occupation, and requires more than a simple knowledge of mining practice. As our Institute represents, I believe, the highest authority in this line of work, I do not consider that any inspector who is earnestly endeavoring to obtain the highest possible degree of proficiency, can afford to refrain from associating himself with the organization, and taking his part in the proceedings. Other lines of specialization recognize the necessity of organization, and I feel that attendance on our Institute meetings should be more generally accepted as not only a privilege but one of the duties of every mine inspector.

Heretofore, although the metal-mine inspectors have been always welcome, the membership of the Institute has been largely confined to the coal-mine inspectors. While it is true that each class of mining has its individual problems, there is so much that is common in coal and metal mining that I feel that we can work together to our mutual interest and advantage. I hope to see an increased membership coming from the ranks of the metal-mine inspectors.

I will not at this time go into details of our latest mine statistics, or attempt any special review of the past year, as there are others here who are more capable of doing this. I wish, however, to express a few general thoughts, and if there should be among them anything that will, even in a slight degree, advance the cause of safety I shall be content.

Mine Accidents Classified as to Their Causes

That the general statistics of mine accidents are not as a whole entirely satisfactory may be conceded. Plans have been discussed, both in our meetings and elsewhere, having in view a more uniform and comprehensive system of conducting mining operations. These efforts, however, are all we have to mark our progress and show our advance along the lines of increased safety.

We all know that, for a number of years past, there has been an increasingly active movement for greater safety in mines. As a result, the danger of coal dust and its remedies are today better understood. The use of permissible powder is extending. A more active interest is being taken in many quarters in the safety-first and first-aid movements, and various other similar reforms are in progress. While there is undoubtedly a slight general decrease of mine accidents, as shown by the statistics, it would not seem that this decrease has been as great as it should have been.

The question arises, Are these reforms being generally applied in mining practice? Or, Has an increased factor of danger, resulting either from the rapid development of our mines or from changed labor conditions, been introduced to partially counteract the movement for safety? I feel that this, at least, is a question on which opinions from some of our members would prove interesting.

It is necessary, if we are to endeavor to decrease our accident rate, to first inquire carefully into the cause of mine accidents. Referring again to our statistics, we find a careful and comprehensive classification of these accidents. This classification, however, deals with the technical, I might almost say the mechanical causes, and does not consider what to me seems more important, the personal or human element concerned.

For instance, as we all know, nearly 50 per cent. of mine accidents come under the head of falls of roof and coal. This is subdivided, as falls of slate or coal, falls in rooms, in haulways, etc. Now falls are more or less common in coal mines. There are dozens, yes, hundreds of falls in mines where no one is hurt, and the incident is not even remembered, much less recorded. It is only where a man is caught and hurt or killed that the fall becomes an "accident." But, let me ask, What is the difference between the fall that catches a miner who thought he could load another car before setting a tim-

*Address of President George E. Sylvester, delivered before the Mine Inspectors' Institute, at the ninth annual meeting, held at Joplin, Mo., June 13-16, 1916.

ber, and the fall that occurs while he is back in a place of safety preparing the timber? The physical conditions are the same, the difference is solely one of the human element, which does not appear in our statistics.

Facts Needed To Properly Classify an Accident

If we are really endeavoring to decrease these accidents, there are a number of facts we should know. Was the accident due to ignorance, improper instructions, lack of instructions, disobedience of orders, lack of discipline, or simply the result of carelessness? Was it the fault of the management or the miner himself; or was it one of those cases occurring much more rarely, where it would seem no human oversight could have prevented the accident, which must therefore be charged directly to the natural hazard of mining? I say "more rarely" advisedly, for in my experience the human element in most of these cases is the vital one.

The same question arises to a greater or less extent in the other classifications made, namely, explosives, haulage, electricity, etc. It is true that in some of these classifications more can be done in what we may consider a technical sense, that is to say, by providing a condition that will make it more difficult for an accident to occur, but even then the condition of ignorance or lack of discipline may interfere and upset all calculations.

I realize the difficulty in compiling such statistics. An operator will report "Fall of slate," "Delayed shot" or "Derailment of motor," for these are usually self-evident, and rarely have a special meaning when it comes to fixing the responsibility. On the other hand, to go into the question of the human element would probably react to the disadvantage of some of the parties concerned.

It is not, however, for placing the blame for the individual accident that this information would be valuable. In fact, if it were to be used for that purpose it might defeat any effort to compile the facts. If we want general remedies we must get general facts to start with, but they must be facts; and I venture to say that if it were possible to collect some correct statistics along this line, they would show startling results.

Duties of Mine Inspectors Often Complex

The primary duty of the mine inspector is supposed to be the enforcement of the mining law. If this constituted his only duty the problem would be much simplified, since every mine inspector has reason to know that a mere technical compliance with the mining law does not necessarily mean a safe mine.

As an illustration, I will assume two mines operated in the same field and working the same seam of coal, under practically the same natural conditions, say generally good top but treacherous in places. The mines have a tendency to dryness but are not difficult to keep clear of dust, while gas is found occasionally. In neither of these mines does the inspector find, on his visit of inspection, any special disregard of the mining law. In the first mine, however, we will say he finds an operator who fully realizes the presence of a potential danger, and believes that safety can only be obtained at the price of eternal vigilance. He is a man who welcomes any suggestion in regard to safety, without a question as to whether or not it is the mining law, and one whom the inspector can feel assured will as faithfully carry out his suggestions, during the month or so of his absence the same as on the day of inspection.

Now, contrast this with the second mine. The operator of this mine believes it to be entirely safe. He complies with the letter of the law because it is the law, but he feels that the law is oppressive and that the so-called safety movements are much overdone. This man is one with whom a suggestion for safety must be backed by the law in order to receive consideration.

While these two mines have been assumed, is there one present who has not come in contact with more or less similar cases? The inspector must keep himself abreast of the times or he will feel his limitations in the first case, while he must be possessed of an abundance of knowledge, force, judgment and tact, in order to make his influence felt in the second instance.

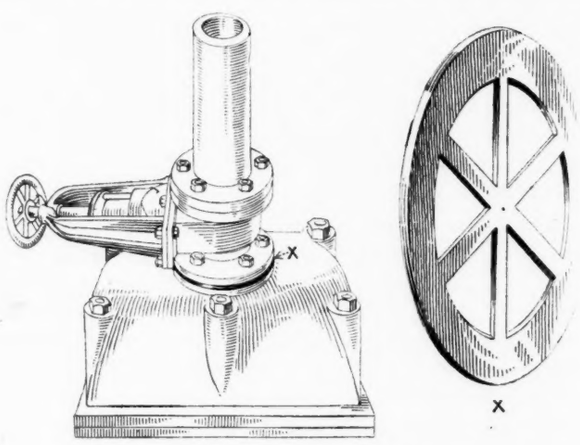
There are other matters that I would like to touch upon, but I feel that it is unnecessary, for we have on our program a number of interesting technical papers and subjects for discussion.

I feel that we are looking forward to an interesting and instructive meeting of the Institute, and trust it will be one from which we will go to our homes with new inspirations for the coming year and with pleasant memories of meeting old friends, and making many new acquaintances during the short time in which we are assembled in a common cause as mine inspectors.

A hearty vote of appreciation and thanks was extended to President Sylvester for his timely address, which was discussed at length by the members present.

To Catch Loose Pump Valves

Some such a strainer as that shown in the accompanying illustration, should be used in the discharge line of a boiler-feed pump, as it will save a lot of trouble. If any



STRAINER IN FLANGE JOINT NEXT TO PUMP

of the pump valves work loose, they are apt to get lodged in the pipe line or some of the valves. The best location for a strainer is next to the pump, but the one shown can be placed between flanges anywhere. It is made out of a sheet of brass or bronze cut to the diameter of the inside of the bolt circle and the web openings or perforations made of sufficient size not to obstruct the flow of water by decreasing the area of the pipe. I consider such strainers entirely satisfactory after several years of use on different pumps.—Charles W. Watkin in *Power*.

Power Department

Centralized Power Plant

By J. M. Poyner*

SYNOPSIS—A coal-mining company that has found it advantageous to centralize its power.

An interesting example of modern power centralization is found in the recent improvements made by the Davis Coal and Coke Co., which controls 26 mines and owns large coal lands in West Virginia and Maryland.

These mines had been operated for years by methods that were representative of the best practice at the time of installation. Steam power was used for hoists and pumps at a number of shafts. When rapid advances in mining practice called for electric power, isolated plants were installed at several of the mines. In these steam-engine-driven generators produced electricity for use underground. In 1911 an opportunity was seen whereby a centralized power plant could be made to generate electric energy that could be transmitted at high voltage and with small loss to a dozen or more mines located within a radius of 10 mi. of Thomas, W. Va.

The equipment of this power plant when first installed consisted of a 500-kw. direct-current turbo-generator and two 1,000-kw. 600-volt alternating-current turbo-generators, together with their exciters, transformers, switchboards, lightning arresters, etc. The direct-current turbo-generator supplied power only for mines near Thomas.

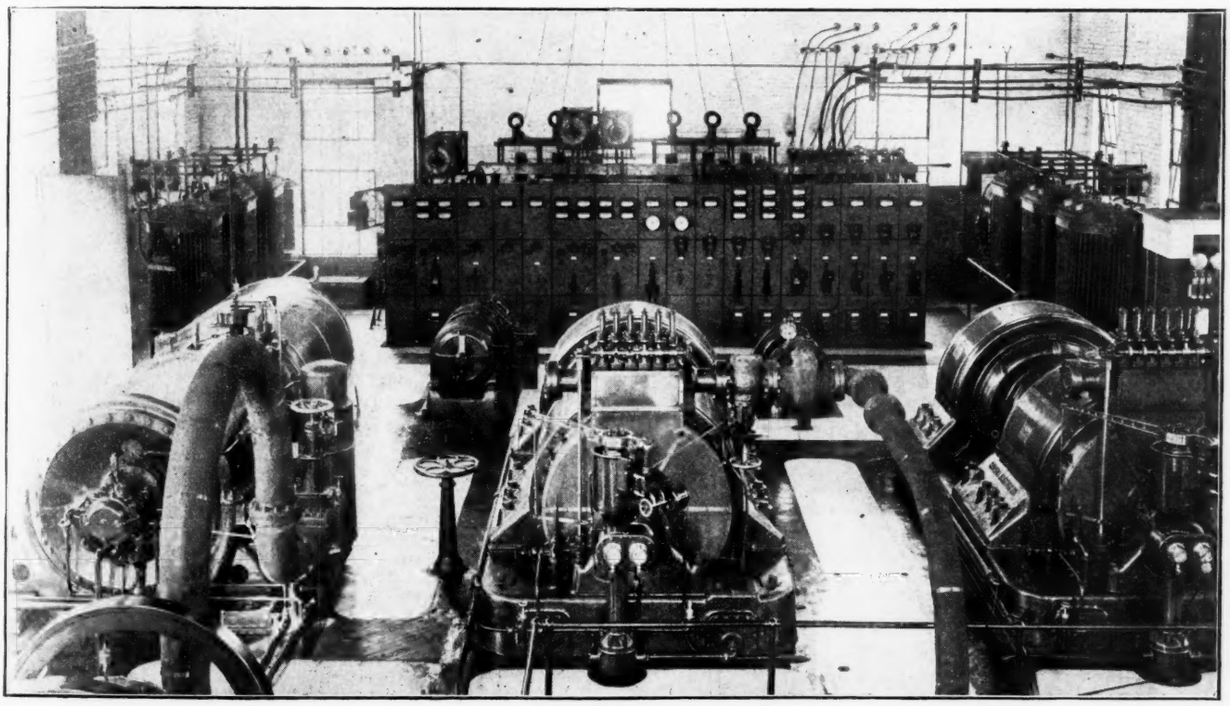
*Baltimore, Md.

The mines not supplied by the centralized power plant still had their own small isolated electric power plants, or used electric energy supplied from the isolated plants at nearby mines.

This was the situation when the present management took charge in 1913.

Mines at which steam hoisting and mule haulage had been contemplated were changed to electric power and the central power station enlarged by the addition of a 2,500-kw. 600-volt turbine and two 500-hp. boilers to take care of the increased demand. The 500-kw. direct-current turbine installed in 1908 was taken out at this time and two 300-kw. synchronous converters installed to give a more flexible and economical arrangement for supplying haulage power to the local mines.

Coal from the mines at Thomas is handled in a tipple operated entirely by electric power. It is here screened into slack, lump and nut. The latter two sizes pass over a picking table where impurities are removed by hand, after which the lump goes to the loading booms.



INTERIOR OF PLANT AT THOMAS, W. VA., SHOWING TURBO-GENERATORS AND OTHER EQUIPMENT

The refuse coal from a Bradford breaker, running 30 per cent. ash, in ordinary times with old methods of producing power would be a waste product; and when coal was in great demand it would be sold. But through the modern methods employed by the Davis Coal and Coke Co. this inferior high-ash fuel is used in the boiler plant.

Forced draft and Jones stokers are used under Babcock & Wilcox and Keeler water-tube boilers. These boilers supply steam at 150 lb. pressure to the power plant, which is adjacent. Water for the boilers is pumped from a

nearby creek. One barometric and two jet condensers are installed.

Ashes are dumped into a larry car that runs under the boiler-room floor. This larry is hauled up a 1,500-ft. incline to a dumping point by a 20-hp. motor. Here the trolley wire and its supports are fastened to the track so that the whole can be barred over sideways a few feet each week onto the newly added portion of the dump.

In the power plant there are now installed two 1,000-kw. 600-volt 1,800-r.p.m. Curtis turbines that have been in use five years; also one 2,500-kw. 600-volt 3,600-r.p.m. Curtis turbine that has been in use one year. These machines receive their excitation when starting from a 35-kw. turbine-driven exciter that is also used as a reserve for emergencies. After starting, all the turbines receive their excitation from a 50-kw. exciter that is driven by a 75-hp. motor. The turbines are controlled from a switchboard by an automatic voltage regulator that holds the voltage constant even though the load varies from 2,200 to 2,800 kw. or more at times.

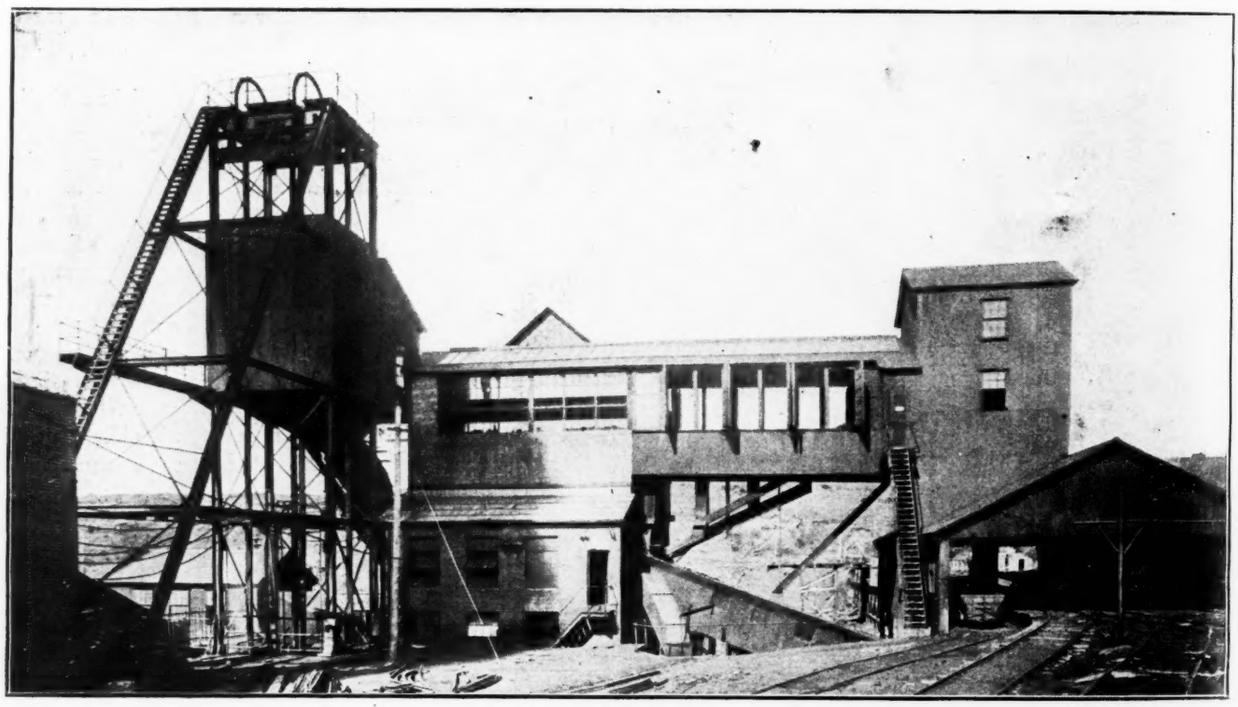
Aluminum-cell lightning arresters are used to protect this machinery. These have been found quite satisfactory in this section of the country, which is subject to particularly violent electric storms.

Power is supplied by the station through two parallel banks of three single-phase transformers to two transmission-line loops, giving, for the most distant mine, duplicate circuits. One of these supplies substations at mines Nos. 38, 28, 40, 39 and 29 by one loop and mines Nos. 41, 24, 36, 37 and 26 by another, all at 6,600 volts. The other, a 22,000-volt loop line, supplies mines Nos. 43, 42 and 22. The farthest mine from the station on the 6,600-volt line is 3 mi. distant, while 9 mi. is the distance for the 22,000-volt line.

The power station also supplies 600-volt direct current from two 300-kw. rotaries for mines Nos. 23, 34 and 25, which are adjacent to the station. Here the direct current is used for haulage locomotives and small pumps driven by motors ranging in size from 2½ to 10 hp. These pumps are portable, and their cables can be hooked over trolley wire wherever they are needed.

Shaft No. 34 was flooded in November, 1913, the water filling acres of workings. After it attained a height of 40 ft. in the shaft, pumps were started and the mine was unwatered in ten months. Several motor-driven pumps were recovered that had been under water all this time. A paper box was built around the motors without removing them from the pump base, and steam pipes were run through this box. After a few hours current was turned on, and the motors have been running ever since, apparently none the worse for their submergence.

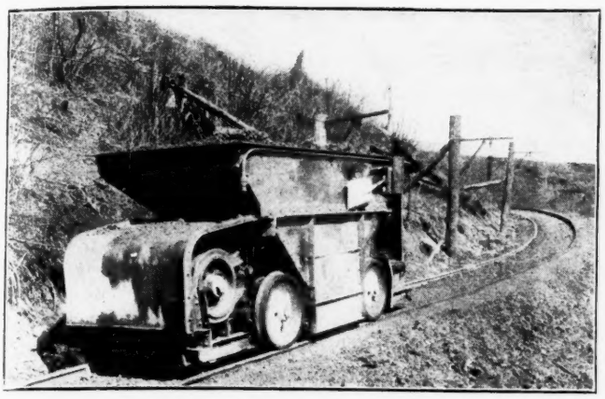
Mine No. 42 at Kempton, Md., is modern in every respect. No mules are used at this mine, as electric locomotives are found to have almost unlimited capacity for handling the haulage problems. Had mules been used, more and more of them would have been required at constantly increasing cost as the workings spread. Two hundred mules have been supplanted by mining locomotives in the last three years at all the mines of this company.



TIPPLE OF DAVIS COAL AND COKE CO., THOMAS, W. VA.

The shaft at the Kempton mine is 450 ft. deep and has been operated for the last year and a half by a 300-hp. electric hoist. Men and material are hoisted at a separate shaft by a 100-hp. electric hoist. Power for these machines and for fans, pumps, mining locomotives and lighting is received at 22,000 volts from Thomas, 9 mi. away, and stepped down to 600 volts by three 200-kv.-a. transformers. Two 300-kw. rotary converters give the direct current desired at 600 volts.

Current for operating all the apparatus and lights of the mine is supplied through the shaft and for a short distance along the main haulageway by submarine cables as a protection against acid water and possible abrasion. This type of cable has been in use for a number of years at some



THE ASH LARRY IN OPERATION

of the other mines and has given excellent results. Eight mining locomotives are in use at this mine.

Electric mine locomotives of both the gathering and haulage types are used in all but two of the company's mines.

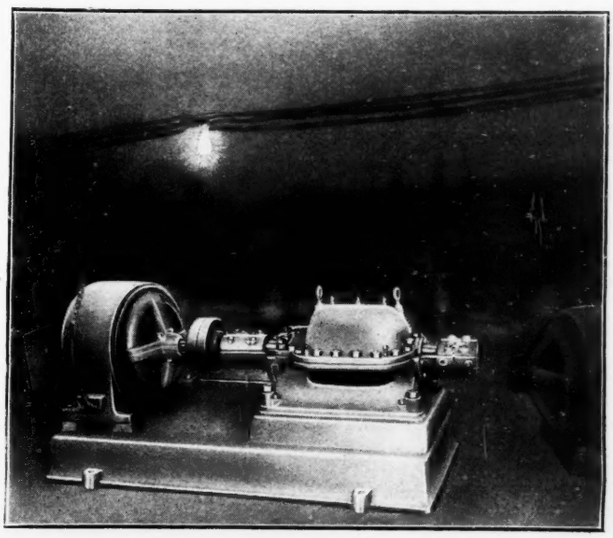
The Coketon mines Nos. 24, 36, 37 and 41 are a mile from the Thomas central power plant. Slope mine No. 41 uses a 20-hp. motor on a rope haul and a 75-hp. motor driving a fan. Mines Nos. 36 and 37 are drift mines that employ three 100-kv.-a. transformers for reducing the 6,600 transmission-line voltage to 600 volts for 35- and 50-hp. fan motors and for pump motors. All these mines are supplied from one substation, containing the transformers mentioned, and two 600-volt rotary converters. Mine No. 24 has a 10-hp. motor driving its fan and a 6-ton mining locomotive. Mine No. 41 has a transformer substation containing three 25-kw. transformers for fan and haulage motors.

REAR VIEW OF POWER PLANT

The Ben Bush mines Nos. 38, 28 and 26 are supplied with 600-volt direct current from two 300-kw. rotary converters. These machines, as are all others about the Davis Coal and Coke Co.'s mines, are protected by choke coils and lightning arresters. They are controlled by oil switches located on a switchboard nearby. Mine No. 26 has a 10-hp. motor driving a fan, and mine No. 28 uses electric power only for a portable 7½-hp. fan motor.

Mine No. 38 has a 35-hp. fan motor and a 100-hp. motor on a pump that was submerged six times in six months. In each case it pumped itself dry. The shaft here is 185 ft. deep, and the equipment has been in use between five and six years.

The Pierce plant consists of mines Nos. 39, 40 and 43. Mine No. 39 has a 35-hp. motor driving a fan at its 450-ft. shaft; and a 1,000 gal. per min. 450-ft. head pump driven by a 200-hp. motor. Mine No. 40 has a 35-hp. motor



PUMP ROOM AT THE HENRY PLANT

driving its fan. Both of these motors have been in use for years. One 100-kv.-a. and three 65-kv.-a. transformers, respectively, are used for the motors named and for lighting the mines. Mine No. 43 has a tram road 2,500 ft. long that is operated by a 270-hp. motor-driven Vulcan slope hoist. A 35-hp. two-speed motor is used on the fan at this mine. Current is supplied from three 150-kv.-a. transformers through 300-kw. rotary converters. This apparatus is protected by lightning arresters and controlled by a switchboard having the necessary instruments.

At Henry, W. Va., a steam power plant containing eight 150-hp. return-tubular boilers and a steam hoist were supplanted by electrical equipment, and an electrically operated tipple has been installed similar to the one at Thomas, already described. A 50-hp. motor is used to drive the fan, and two 100-hp. 1,800-r.p.m. motors are direct connected to two 1,000 gal. per min. 250-ft. head Platt pumps. Two 300-kw. rotaries and their transformers are here installed. The installation of electric power at this mine increased production and reduced power cost to such an extent that ten times as much coal was produced per ton of coal burned for power.

Practically all the electric equipment at the Davis Coal and Coke Co.'s mines was furnished by the General Electric Co. The tipples and preparation machinery were largely supplied by Heyl & Patterson, Pittsburgh, Penn.

When the Boiler Attacks the Engine

By C. W. Crawford*

SYNOPSIS—Steam engines are designed to operate on dry saturated steam, not hot, incompressible water. When, because of faulty boiler design, more water-spray resulting from violent ebullition is carried over to the engine than the clearance space will accommodate, a smash-up is probable. If this occurs, everybody gets mad—except the boiler builder.

Great events and great discoveries usually do not mature suddenly, but require time to soak in before becoming available for public use.

When we think back the distance of a lifetime, we find the discoveries of two of the greatest scientists lay dormant 30 years before being applied to actual production. The idea of the compound engine was held in expectation from one century to another before its final consummation, and the plain steam engine itself is little better understood by the mass of users now than it was in the time of James Watt and his contemporaries. When engineers split on the construction and application of everyday natural laws, it means a lack of education, or worse—consummate ignorance. When the fundamental law by which we understand that "no two bodies can occupy the same space at the same time" is violated, it means instant calamity, and such calamities are of too frequent occurrence among users of steam engines—and automobiles. Hoisting engines as well as others are built to operate on what is called dry steam—that is, saturated steam that carries no water in suspension—a compressible elastic fluid, not solid or liquid.

Hot water is not steam, although it may be of the same temperature as the steam it contaminates. It produces no power in the cylinder, but it costs about as much as the steam it accompanies. It occupies space that ought to be filled by steam, and when present in greater volume than the clearance in the cylinder the piston stops abruptly upon striking it, while the winding drum, which is the equivalent of a heavy flywheel of 10 or 15 tons, lurches ahead by its own momentum and produces a force that is incalculable. Something has to give way. It is usually the weakest point that fails first. This may be any one of a dozen points, but break it must somewhere.

Applied to the hoisting of coal the steam engine exhibits traits that are not always understood by the men who profit by its use, and frequently such traits are furiously assailed when things happen out of the ordinary. In these times of rapid development any man may call himself an engineer if he wants to—it isn't compulsory to know much.

Hoisting engines, as used in coal mines, are subject to the severest duty of all engines—not by reason of higher pressures alone but by the extraordinary intermittent load and the severe method by which they are necessarily manipulated to meet the demand for big output. The output is increased whenever possible, and the older engines are made to do double the duty they were built for; and on top of this, strenuous handling by expert engineers engenders enormous shocks and stresses. But, fortunately, such violent usage is still within the usual factor of safety when the engine is operated on dry steam—not hot water.

But another force has been adopted and introduced by the boiler makers that makes more mischief than all the mishaps of the engines put together. Existing methods, however successful, were deemed out of date and due to be abolished. The ignorance of the old-time engineers could not be endured. Uptodate methods of high educational origin were imperative, regardless of the frightful experience of the early steamboat times when few other power plants existed in the country, and when as is usual at the present time, the slugging of water through the cylinders caused many a catastrophe—flying pistons and cylinder heads and other things sweeping the deckrooms, knocking down boilers, etc. The cause of this confusion was found to be attenuated pipe connections from boilers to engines, the pipes being so small as to suck the spray, as it were, arising from the boiling contents of the boiler together with an occasional solid slug of water; and having no separators, the water occupied the piston's place in the cylinder; and the 40-ft. "lumber yard" paddle wheel did the rest.

The changes made to relieve this condition consisted in large steam drums—and in some cases auxiliary drums—being substituted; also large steam pipes. The drums were connected direct to the boiler by large short legs through which any water raised from the boiler might drip back again by gravity. After these changes were adopted, practically dry steam was insured and the smash-ups ceased.

This sort of practice is old now and its immunity from accidents is lost sight of. A new regime is in vogue, copying the ancient practice of the early steamboat age with all its bad results. This relapse into antiquated methods is the present cause of thousands of so-called accidents, and the blame of it all is usually charged to the engine builder.

No charge is made against the boiler maker who has relegated the steam drum out of existence, and who is hedged by the law in some states and is therefore invulnerable. Boilers are all made by the same formula—well made, of good material and entirely above suspicion, except that all large boilers (72 in. by 20 ft.) have the same little 6-in. exit hole for the steam pipe and no dome of any kind, only just a header line too small to be called a dome.

This is the uptodate usage. "What private griefs they have we know not, that make them do it—they are wise and honorable, and will no doubt with reasons answer you." It is positively denied by some engineers that water is carried over from the boilers while others admit it freely. The truth is found somewhere between the two assertions. Anyway, some water does find its way into the cylinders, sometimes in solid slugs, and the speed of the piston being rapid the water cannot follow the escaping steam quickly enough and is overtaken by the piston at the toggling point of the crank, where the momentum of the heavy winding drum exerts an incalculable pressure on crank and piston. Just here is where the smash-up comes.

The inertia of the water in the cylinder precludes the possibility of its escape quickly enough through the exhaust. Hence the piston strikes the water solidly, and having the right of way the water must get out or

*The Crawford & McCrimmon Co., Brazil, Ind.

something must break. When the piston stops dead against the water near the end of the stroke and the crank cannot pass the center, the shaft sometimes lifts up instead, breaking the bolts, or the cap, or both. This is only one vagary of a bad smash-up—one in a dozen.

It is not known exactly how the water behaves in a boiler, but everyone knows how it behaves in a pot boiling violently on a stove. Steam generated at the bottom of the boiler and around the tubes must escape upward through the water—as in the pot. The surface of the water is agitated in proportion to the intensity of the heat. That the limited steam space is thus filled with fine spray is certain. It may be compared to a storm at sea as seen through a bullseye. This is the wet steam furnished by the boilers now in vogue, which have not ample space for the spray to settle.

In the limited steam space above the water line the efflux of steam from the surface of the water maintains a constant agitation—a rough sea running all the time. The tops of the waves are whipped off by the furious current of outgoing spray and steam and carried to the engines, together with an occasional roller or solid wave. It is easy to understand that the highest waves will be drawn by the powerful current of steam toward the outgoing steam pipe—and the smaller the pipe the more vicious is the current. Hence the propriety of increasing the size of the pipe 400 per cent. to reduce the velocity of the current and to allow the spray time to settle and remain in the boiler.

Old Practice Secured Dry Steam

Old business doesn't count. In the usage of steamboats (before the war) it was usual to make the steam drums 30 to 48 in. in diameter, connected directly to the boiler by a short leg of 9 to 12 in. in diameter. The steam pipe of proportionate size was made to project into the steam drum a foot or more to procure the drier steam from the center of the drum. Dry steam was a certainty, and immunity from water in the cylinders was practically absolute.

Compare this with present-day service where, as one engineer expressed it, "water is ejected from the escape pipes by tubfuls—hot water that costs money to pump and to heat." However, the operator doesn't mind a little leak like that when the coal is coming rapidly. It is when the smash comes he gets mad—in fact all hands are mad, engine builder and all, except the boiler maker.

When a large engine draws its supply from a boiler having small storage capacity the order invariably implies watered goods. A good-sized smash-up lays the mine out for a week or a month, hence it is cheaper to eliminate the cause.

Boiler makers sometimes advise a steam drum at the other end near the engine, where the steam takes a plunge bath in the condensed water and becomes more fully loaded with moisture before entering the cylinders. But it carries water and mud from the boilers just the same. The mud, however, does less mischief than the water. It merely clogs the packing rings and balance valves, causing leakage and waste of steam, as well as additional wear.

But, when the boiler persists in slugging mud and dirty water through the engine, engineers ought to do something about it.

Who's Who In Coal Mining

James Needham

One of the interesting and important figures in the coal industry of the Middle West is James Needham, president of the St. Paul Coal Co. Mr. Needham is an example of that class of mine officials who have come up through the engineering branch of the business. He is college bred, acquiring his early technical knowledge in the engineering school of the University of Illinois.

He is a man of ripe experience, having started his practical training as a prospector in Alaska and the Yukon in 1897, which work he forsook to accept the position of assistant engineer with the Union Pacific Coal Co. in 1900. Later, Mr. Needham was made chief engineer, with headquarters at Rock Springs, Wyo.

In 1904 he left the engineering department and was made superintendent of the Cumberland, Wyo., mines of the Union Pacific Co. This position he occupied until

JAMES NEEDHAM
President of the St. Paul Coal Co.

1908, when he accepted a place as general manager of the Washington Union Coal Co., Centralia, Wash. This concern was a subsidiary of the Union Pacific Coal Co. In 1911 Mr. Needham left the State of Washington and came to Cheyenne, Wyo., as general superintendent of the Union Pacific Coal Co.

In 1912 he entered the employ of the Chicago, Milwaukee & St. Paul Ry., in that company's coal department, as general superintendent of all its mines; at the same time he was appointed president of the St. Paul Coal Co., and occupies that position at present.

Mr. Needham is a member of the Chicago Automobile Club, also the Illinois Coal Operators' Association and the Montana Coal Operators' Association. He has perhaps as wide an acquaintance in the coal fields west of Chicago as any man in the industry, and being a comparatively young man—he is only 45—the future holds great promise for this popular member of the coal fraternity.

The Labor Situation

General Labor Situation

The members of the district executive board of the United Mine Workers in the anthracite region are to meet with the general grievance committee of the Delaware, Lackawanna & Western R.R. Co. mines to talk over grievances of long standing that the general committee has failed to have adjusted. The price of powder, machine mining scales and other grievances are included among the list to be submitted by the general committee.

The general committee first believed that a special district convention should be called to take up the matter, but after a conference with the district board it was decided to go about getting adjustments in the manner prescribed under the contract. That plan is satisfactory to the general committee, and the idea of calling for a special district convention has been abandoned.

The general committee is made up of representatives from the grievance committees from the various Lackawanna collieries and holds regular meetings. This committee recently started a big campaign for an adjustment of machine mining rates and several strikes resulted but they were called off after the grievances had been laid before the conciliation board. The decision from the board has not yet been handed down and it is said the committee is getting restive under the delay.

The going on strike of 16 motor runners at the Coalbrook mine of the Delaware & Hudson Co., threw 1,500 men out of work for a few days.

The motor runners have been paid according to the time they work. For the first six months, they receive 24c. an hour; for the second six months, 26c., and for the second year, 28c. The runners claim they want a uniform scale of 28c. an hour for all.

The grievances of miners of seven different collieries were heard by the anthracite conciliation board at Pottsville on Dec. 4. East Bear Ridge miners claimed they were being paid but 44c. for rock mining instead of 88c. per yard, to which sum they claim they are entitled.

Various Increases Are Demanded

Timber cutters at the Bast colliery asked for 7 per cent. increase of wages instead of the 3 per cent., which they are now receiving. Girard Mammoth and Hickory Swamp miners also demand an increase in wages. The most important case was the demand of the firemen at the collieries from St. Clair, for an 8-hr. day instead of a 12-hr. day. The board reserved decisions on all cases.

United Mine Workers local No. 1403, having 1,400 members, at Shenandoah, on Dec. 4, applied through counsel for an injunction to prevent International President John P. White and other district officers from carrying out an order of expulsion recently issued.

This local with two others nearly as large were expelled for alleged illegal payments of benefits during an unauthorized local strike. The expelled members allege that they have paid more than $19,000 into the union and to deprive them of the union button is virtually to deprive them of opportunity to make a living.

Mine Workers of the anthracite field will not be permitted to form any locals for particular nationalities under a ruling made on Dec. 9 by President Thomas Kennedy, of the 7th district. He declined to permit the Polish employees at Lansford to organize a union among themselves on the ground that this would make two at the one operation and would be in violation of the constitution and by-laws.

Because a few of the employees failed to wear union buttons at the Lehigh Coal and Navigation Co.'s No. 4 slope and No. 5 shaft on Dec. 9, a strike was inaugurated, more than 800 men being idle.

Several hundred bituminous miners at the Robertsdale mines, along the East Broad Top railroad, which supplies all the coal for local plants at Mount Union, and which have been closed for several months returned to work on Dec. 7.

Six men were shot, and wounded, two probably fatally, and several others were bruised about the face, as a result of a clash shortly before noon on Dec. 6, between deputyguards on the one side and striking coal miners of the Saltsburg Coal Co. on the other, near the Pennsylvania R.R. at Avonmore, near Kiskiminetas Junction. Four of the wounded miners were taken to hospitals in Pittsburgh. The clash occurred, when striking miners attempted to approach five men said to have been imported as strike breakers.

About 4,000 coal miners in the Kiskiminetas district have been on strike over nine months. About 400 men, employed by the Saltsburg Coal Co., have been affected by the strike.

Argument was concluded on Dec. 9, in the injunction case of the Central Pennsylvania Coal Operators Association vs. Charles H. Rowland, a mine operator. Just prior to election the men in the Rowland mines demanded an increase in wages of 33⅓ per cent., which was granted. The Coal Operators' Association, of which Rowland is a member, instituted proceedings to restrain him from paying the increase. They contended that by so doing he violates the agreement between the operators and miners. Rowland was a candidate for Congress when he agreed to the wage increase.

There has been practically no change in the labor situation in Somerset County during the past week, except that the number of men at work has slightly increased.

The car supply has been worse. The car supply in the Pittsburgh district was also very poor during the week.

In the Pittsburgh District there has been considerable unrest the past week in the labor situation with threats of strikes over the use of electric storage battery cap lamps and permissible explosives in some of the union mines including one of the Pittsburgh Coal Co. The union officials are playing politics due to the election of officers to take place Dec. 12, for which there are two tickets in the field, and if trouble can be averted until after the election it is thought it will not materialize. The present District officers are expected to be reëlected.

Congressman Adam B. Littlepage, acting as umpire in a dispute between miners at the Rush Run (West Virginia) coal mine and the mine owners, resulting from a demand for an increased price for pick mining, has held that the demand is in violation of the existing contract between the men and the operators in the New River field, and should not be granted.

Coöperative Mines Organized

Edward Dobbins, member of the Executive Board of the Illinois Mine Workers, has just completed organizing the miners of the Winkle Coal Co., a coöperative concern, after two years' attempts. About 100 men are affected.

Duncan McDonald, Secretary-Treasurer of the Illinois Division of the United Mine Workers of America, is compiling figures which are intended to show that the present high prices of coal are out of proportion to the increases the miners received under the scale signed when the last contracts were approved. The increase for mining was approximately 3c. a ton, while day laborers received a 5 per cent. increase. According to figures obtained by McDonald from various Illinois cities the smallest increase demanded of the consumer is 20 per cent. and from that all the way up to 75 per cent. McDonald is to lay the information before a committee of the City Council of Chicago, which is investigating the high price of coal with a view to establishing municipal coal yards.

The coal miners and operators conference committee, representing the union miners of Oklahoma and the Oklahoma Coal Operators Association, which has been in session at McAlester, Okla., for several weeks framing the biennial wage contract, has completed its work with the exception of the section covering the strip pit scale. It is expected that this will be agreed on in a few days. It is predicted that the contract will soon be submitted to the miners for a referendum vote to be ratified or rejected on Jan. 18. In the contract so far framed the coal miners have been awarded practically all points sought by them.

The situation in Canada, in Australia and in Great Britain is similar to that in the United States. There is a shortage of coal in those fields which is rather greater there than here, men are being drawn away from the mines to munition service and the prices of all articles of food are continually rising. The shortage of men in these great coal-mining centers is increased by the vigorous recruiting. In Canada and Great Britain, if not in Australia also there is an unexpired contract which the miners have to break if they want to obtain the wage increases they seek.

There is one peculiar condition in Canada. The Canadian mine workers belong to a union, the United Mine Workers of America, that is an alien organization. The operators of Canada are considerably hampered by that fact. In the United States the United Mine Workers had made a commendable effort to be true to its contract. In Canada it has not shown any such disposition, probably because it is a perilous thing for foreigners to meddle in a domestic matter where it is clear that their policy does not accord with the policy of the majority.

John P. White and his aides may refuse succor to local and district unions in the United States that want to break their contracts and they may oust such locals as will not abide by their pledged word, but it is a harder matter to rein in foreigners who have it in their minds to do as they please. Think how hard it would be to make mine workers of the United States toe the mark if Canadians filled all the most important and nearly all the lesser offices in the gift of the union. It is not wonderful therefore that John P. White and his associates, who really do have a consideration for their signatures and recognize the binding force of the contracts they sign, seem more or less powerless in Canada and conscienceless also. Another reason why they are weak is because they are not personally much committed. They have not been active in Canadian settlements and accordingly they do not feel an active responsibility for their maintenance.

The coal strike involved 10,500 coal mine workers in eastern British Columbia and Alberta. The contract had still four months to run but the mine workers refused to wait. As their demands for a 25 per cent. increase were not conceded at the time specified, Nov. 26, they went on strike on Nov. 27. They evidently expected what ultimately happened—an early concession and return to work, for contrary to their usual practice they failed to bring out their tools from the working face.

They claimed justification for their violations of contract but these claims were positively without substance. It would have been better had they taken the bull by the horns after the manner of Bethmann-Hollweg in Belgium than to have taken up with such flimsy excuses. The mine workers in the United States could claim equal justification for a breach of contract. One excuse was that the agreement anticipated breaches of its various clauses as was shown by its providing penalties for such violations. One might as well excuse burglary by a specious position of this kind. The government expects thefts as is evident because of the laws on the subject and the jails it has built. Therefore these specious logicians would argue that theft is anticipated and not to be condemned.

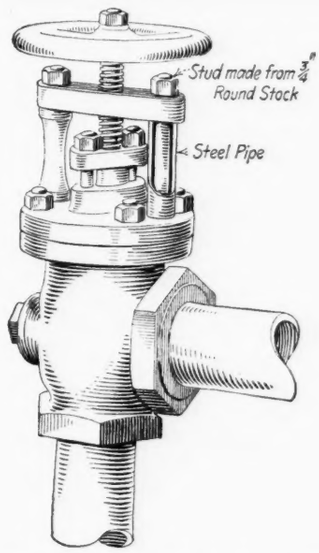
Another reason given for excusing the breach in the contract is that one clause which is entitled "Settlement of Local and General Disputes" specifically states that any breach of the contract by either party shall not be allowed to void the agreement. This recognition of the possibility of violations furnishes a reason for violating the contract that is on a par with the previous one. It is hard to see how such false reasoning can be advanced. Yet it appears in all seriousness in the "Daily News" of Nelson, B. C.

The coke ovens at Fernie and Michel were being operated by nonunion men but on Nov. 28 these men also laid down their tools. At Coalhurst the company shut down the water supply to the inhabitants. It is not safe to blame them for this action without knowing the conditions. If it was done to coerce the miners and not from lack of fuel it was wrong, for the mine workers are forbidden by their contract to coerce the operators by shutting off the pumps in the mines or by refusing to dig coal for running the boilers for those pumps or by failing to make necessary repairs to maintain the mines in working conditions. So long as the miners kept these rules, shutting off the water would be of extremely doubtful propriety.

Large Range of Fuels Can Be Burned in Powdered Form—Low-grade bituminous coals, anthracite and lignites can be burned in a powdered form with good results. Even coke breeze when so powdered can be used. Certain types of furnaces are now being operated with such fuels. But the first cost of fuel is not the correct index by which to judge of economy when fuel must be prepared and pulverized. Low-grade bituminous coals, being high in noncombustible content, occasion an inordinately high pulverization cost as compared to that incurred in the comminution of high-grade bituminous coals. Equally, anthracite coals of highest first cost not only add to the pulverization cost on account of their hardness, but are uneconomical otherwise because, having a high fixed carbon content, they have a much higher ignition. This causes them to be uneconomical even though they have a low noncombustible content.—C. J. Gadd, Journal of the Franklin Institute, September, 1916.

Valve Yoke Stud Repair

While making repairs to a blowoff valve, it was found that one of the yoke studs had corroded away to less than half its original size, says a writer in *Power*, owing to a leak from the stuffing-box dripping on it. Not having



STRAIGHT STUD AND PIPE SUBSTITUTED

a lathe to turn out one like the original, a piece of ¾-in. round steel stock was threaded at each end and a piece of ¾-in. steel tubing put on, as shown in the illustration, care being taken that the length equaled the distance between the shoulders of the old stud so that the valve stem would work freely in the yoke.

Patience and Common Sense Win Eventually

Two stalwart horses drawing a heavily loaded coal wagon up a steep grade stopped when halfway up the hill. What did the driver do? Did he rant, emit sulphurous words, lash the horses viciously or rush into the nearest drug store and 'phone the yard office two miles away to send another team to help? No. He jumped from the wagon, grabbed a chunk of coal the size of a cabbage, placed it behind the nigh hind wheel, walked to the horses' heads, and called each one by name as he patted them on the nose. Five minutes later he gave them the word of command, walked alongside as he guided them diagonally across the street, where he stopped them and repeated the performance. While the horses rested, he went back after the chunk of coal that he had placed beneath the wheel at the first stop. This process was continued until the team gained the top of the incline.

If I owned a coal yard, in order to get that driver to work for me, I would offer him $2 a week more than any other man whom I happen to know at this time. His method stood out in bold contrast to that of some other drivers that I have noticed, who, under similar conditions, whipped, stormed and swore at the horses until they were so nervous they failed to pull at all.

[There is a lesson in the above true story for foremen who employ drivers underground.—Editor.]

Editorials

Is the Sulphur Found in Coal Innate or Extraneous?

Of all the many valuable bulletins published by the Illinois Engineering Experiment Station, that entitled "Dry Preparation of Bituminous Coal at Illinois Mines," by E. A. Holbrook, is among the best. It gives a marvelously complete consideration of the subject of impurities in coal beds and their removal. The author shows much insight and power of research.

Perhaps it may be permissible to question some of the less important statements and to reiterate here some of the arguments, already published in *Coal Age* editorials, on the inmateness of sulphur in coal beds. Such, for instance, have been the articles on "The Original Sulphur in Coal," Aug. 23, 1913, and on "The Element Sulphur," Oct. 18 of the same year.

"Original Sulphur," in the first editorial, is defined as "the sulphur which was an integral part of the vegetal substance composing the peat bog from which the coal bed is derived." It is also termed in that editorial "intrinsic sulphur." Holbrook would have expressed it, had he referred to it, as "innate" or "inherent sulphur," both expressive words and possibly less subject to uncertainty of meaning than the word "original."

The remarks immediately following may be regarded as excessively finical, especially as applied to a technical publication. But the endeavor is made to prove by the language of one line of the text what could be more clearly and abundantly proved by quoting two whole pages of Holbrook's monograph. Such long quotations are always inadvisable, for they muddle the waters by introducing a number of matters not exactly relevant to the issue at hand.

In his discussion Holbrook puts in one group "innate, intermixed, inherent, normal-ash or inseparable impurities." The use of the word "or" is unusual, and it is necessary to put a construction on it that we shall now essay to do, we hope without prejudice to the author.

A group of any kind cannot be composed of permissive members. For instance, we cannot say there was a group containing Brown, Jones or Robinson. Is it unreasonable, therefore, to assume that Holbrook intended to place in this group all "impurities that are innate, intermixed, inherent, inseparable or present in normal coal"? This interpretation makes the author say that such of these qualities as are not identical are coexistent; that is, all innate impurities are intermixed, all are inherent, none of them can be separated from the coal substance, and every one of them will be found in the ash of a normal piece of coal. So these words, if the proper meaning has been placed on them, express ways of looking at each and every impurity in the group. They do not enumerate the impurities in any way. They merely characterize each and every one of them by attributive adjectives common to them all, but largely expressive of variant qualities which are to be found in all of them.

So the statement appears to say that what is innate in coal is also inseparable from that substance. But is that true? While born, as it were, within the bed—sucked in by the vital action of the plant and absorbed into its very life by biochemical actions—it may yet have been later so far segregated as to be now separable by mechanical and gravimetric action. It was the object of the two editorials quoted to show that there was a great possibility amounting to probability that much of the pyrite, segregate and separable as it now is, was at one time a part of the plant life—was what Holbrook would term, not extraneous, but innate.

Holbrook says on page 54 of the bulletin referred to:

> Since coal is a product of plant remains, it must contain the orginal mineral matter or ash of such plant. Trees or plants of the present day contain about 1 per cent. ash, but since ancient plant remains have undergone great changes and losses of weight through partial decomposition before arriving at their present stage of coal, and since the mineral matter remains without loss in the decreasing residue, the inherent ash may amount to a much larger percentage in the coal than in the original vegetable matter. Such impurity may be considered a part of the original coal substance.

In general all this is true. But it too readily overlooks the possibility of segregation by bacterial action and solution. Also, it may be added, as an aside, that the effect of possible evaporation and transpiration as a compound is disregarded. It is a fact that there are no deposits which as a whole contain so much sulphur as bituminous deposits. Sulphur is found in relatively large quantities in oil, in asphalt, in gas and in coal.

When we turn to slates and sandstones, we find a percentage of sulphur which averages only about two-tenths of one per cent. for the first and three-hundredths of one per cent. for the second. Was ever coal found with such an absence of sulphur? If a coal contained such a low percentage as either of those mentioned, it would be difficult to understand how the original plant in the peat bog managed to function, for, it will be realized, how extremely low a percentage of sulphur in the original bog substance would be indicated, when due regard is paid to the losses of hydrogen and oxygen which the bog sustains in being converted into coal; for sulphur seems an essential element of life.

Moreover, it is an important constituent of modern peat bogs. In Alfred Dachnowski's bulletin on "Peat Deposits" in the State of Ohio, A. C. Fieldner's analyses there quoted show that sulphur in the crude bog when the moisture is evaporated runs from 4.57 down to 0.21 per cent. After such bogs solidified into coal, provided the sulphur was not carried away, it would form a fuel with sulphur content the same as that found in ancient coal beds.

Perhaps it will be contended that these peat bogs have sulphur that is not innate, but extraneous. However, even if this be true, the sulphur cannot be accounted for as Holbrook accounts for the pyrite in the coal. He regards the presence of pyrite as resulting from underground circulating waters that pass through the openings in the bed, which openings arise from the shrinkage of the mass.

The peat bog has hardly reached that implastic stage. The sulphur in it surely has been taken up as a vegetal food. If, then, the original bog always contained as much sulphur as the coal which results from it, surely the sulphur is innate even though separable.

It should be added that the stand taken by E. A. Holbrook is one in which he is supported by every writer on impurities in coal. It is assumed by all of them that because the sulphur is found in true mineral form and segregated, its entrance into the bed is to be explained without reference to biochemical actions. It seems, however, time to question the general assumption.

Check-Offs and Taxation

Probably the most interesting discussion at the American Mining Congress was that on the check-off, in which John P. Reese was the star speaker. Mr. Reese made quite a convincing plea that the United Mine Workers of America, a representative body, was justified in levying taxes on all coal-mine workers—a privilege now restricted almost everywhere to the sovereign power of nations.

His argument is irrefutable if we concede that there is a parity between a state and a labor union. If we consent to let the United Mine Workers use the check-off in the class war, why not let the suffragists or their opponents use it in the sex war, and the prohibitionists or the preparedness advocates use it in the promotion of their propaganda? Why not allow the German-Americans and other brands of hyphenates to make forced levies on the people of foreign birth? Why not permit the churches to compel membership and to levy taxes, provided their regulations provide for the rule of the majority?

Mr. Reese, like many others, believes that all good things come from unionism. He assumes that Bill Smith, who now gets $1.10 a ton where he used to receive 55c., is so paid because the union got him that price. It is not possible to concede this point to him, certainly not in its entirety. It is just barely possible that the class war has done something for those who have waged it. To many it would seem that more would have been gained by coöperation than by conflict, and that the advances in the welfare of the workingman, in so far as they are real, have not come from the class war at all, but from improved methods of production and distribution.

In fact, the war of the unions against capital has tended to impoverish mankind. In so far as it has been localized to one industry, it has only enabled that industry to levy a tribute on the others, the size of which is limited only by the aspirations of the workers in the industry and their willingness to suffer in pursuit of them.

The success of a farmers' union in raising the price of wheat would not be a source of any congratulation to the miner who had to buy it, unless the price to which it was raised was that which was needed for a proper conduct of the farmers' business. But the unions are not caring for any such principles. They make unregulated attempts to raise labor prices to the highest notch, by an agitation which means often much hardship to the unionized men who are thus making the attempt, and higher prices to all other unionized and ununionized workmen. Is this such a noble end that in its pursuit it is permissible to dragoon men into the union?

Mr. Reese declares that the union dues are no small burden; therefore, every miner should pay them. But surely their burdensome character has nothing to do with the matter. If the purpose for which they are imposed is questionable, no one should be required to pay them.

The union has done little for the workingmen as a whole. Wages are even now rising almost everywhere except in unionized industries. It is true that in less fortunate times the unions alone participate in increased wages and prevent decreases. But unions help wages as a whole hardly at all, and where they do, they only raise the cost of living accordingly.

Why, then for such a questionable purpose, should we delegate to a class the unrestricted right to tax and to coerce? Why, for such uncertain ends, should we refuse liberty to anyone? If in any industry labor takes such restrictive privileges, then surely regulation by the public should prevent those rights from being abused. The right of a body of citizens to combine and to compel others to combine with it must always be accompanied by regulation. The miner who organizes to make the trackhand and day laborer give him a 4-hr. day, at a lordly rate of pay, should be compelled to remember his obligation to these other working men.

One of these days we shall refuse to allow even to geographical units, known as nations, the right to legislate freely at their own sweet will without some international restraint. Why should we grant unrestricted rights today to those who merely differentiate themselves from others by the production of coal or of some other commodity?

No "Boozehoisters" Allowed

The E. E. White Coal Co., at Glen White, W. Va., has recently issued orders to all superintendents and foremen to discharge all men known to be drinkers. This is done as a safety precaution, it being considered dangerous to have men in or about the mines whose senses are in the least dulled through indulgence in liquor.

This order well illustrates the trend of the times. The popular idea concerning drink has undergone a considerable change in the past, and it would appear that still greater renovations are yet to come. Not so very long ago, probably well within the memory of some men now living, alcohol was regarded as almost a necessity. The building of a bridge, a barn or a church required the friendly stimulus of a "jar of rum."

Science and experience have each demonstrated the uselessness of alcoholic stimulants. A business as inherently hazardous as that of coal production requires the exercise of constant and neverfailing vigilance, sound reasoning and careful judgment. With all of these "booze" notoriously interferes.

The lawmakers and the clergy may legislate and preach against liquor as much as they please—they have done so for many years—yet the layman has in some instances at least clung tenaciously to his "schnaps" and considered that the slaking of his thirst was nobody's business but his own. Safety and efficiency have recently, however, become terms to juggle with, and anything that injures or detracts from either is doomed to the scrap heap. Consequently, it will not be strange if within a comparatively short time we may see over the door of the employment office of every industrial establishment, mines included, the motto, "No boozehoisters allowed."

Discussion by Readers

Textbooks in Examination

Letter No. 2—I read with great interest Thomas Hogarth's defense of the use of textbooks in coal-mining examinations, *Coal Age*, Nov. 25, p. 896, and can say that I thoroughly agree with all that he says, although I am inclined to feel, with his "mining acquaintance," that formulas should be omitted in a practical examination, as far as this is possible.

However, I will explain that, while believing that every mine foreman should familiarize himself with the more simple formulas used in mining practice, I do not think it wise to estimate a man's capability to fill a mining position from his knowledge and ability to use intricate formulas and to solve difficult technical and mathematical problems.

The average mine foreman who has gained his knowledge and experience by hard work in the mines has not had the time to devote to study to enable him to deal intelligently with the intricate formulas that are used by the mining engineer. His spare time has been employed in learning the many things that are necessary for him to know in order to safely conduct the operations of the mine in his charge.

An old saying is, "a little knowledge is a dangerous thing," and, should the average foreman attempt to handle anything more than the most simple formulas, he would be liable to misapply them and make costly mistakes that a trained engineer would avoid.

Again, the introduction of too many or intricate formulas into an examination would result in the failure of many experienced, well-informed and capable men to pass the examination, while the younger and less experienced fellows would be able to secure a certificate because of their better education and mathematical training. All will agree that these younger men with less mining experience, however, would be incapable of managing the mine with the same degree of safety and economy as the older men who failed in the examination because they lacked the mathematical training.

Certificate Not Proof of Competency

There are many examples of young fellows holding certificates of competency to act as mine foremen but who are entirely incompetent to serve in that capacity because of their limited experience. On the other hand, there are many practical men who are fully competent to take charge of a mine but are unable to do so because they lack the necessary certificate, owing to their limited knowledge of mining formulas.

In further support of Mr. Hogarth's position favoring the use of textbooks in a practical examination, permit me to quote a statement I overheard a wise professor make a few years ago. I do not remember his exact words, but they were to the effect that "it was of far less importance to memorize formulas than to know where to find them when needed and how to use them when found." He added that "it is much safer to get a formula from a textbook than to take a chance of depending on one's memory." He stated further that he allowed his students to use their textbooks in examination, for that reason.

In closing I want to repeat what has often been forcibly stated before, that a foreman, confronted in his work with a problem requiring the use of a formula for its solution, would at once refer to his textbook, to which he has free access in practice. Therefore, in order to demonstrate his ability as a foreman, I believe that he should have the same privilege in examination and be permitted the use of the necessary textbook to which he has free access in practice and which he should bring with him when taking the examination.

Edward H. Coxe.

Pittsburgh, Penn.

Letter No. 3—I was greatly interested in Thomas Hogarth's letter, *Coal Age*, Nov. 25, p. 896. I cannot say, however, that I would approve of the use of textbooks in examination for two reasons: (1) Most examining boards take their questions directly from these textbooks. I was surprised to find that 24 out of the 26 questions asked in a recent anthracite examination were published in a textbook. (2) Textbooks publish practical questions as well as the theoretical questions involving the use of formulas.

Some years ago, when preparing for an examination for a mine foreman's certificate, I went to an old foreman and asked him to post me on the formulas necessary to solve problems in ventilation, pumping, timbering and haulage. He told me that during the first six months that he was foreman he had little use for formulas, as he quickly forgot them; but he has since found that it was a great relief to his mind to carry these formulas in a small pocket textbook, which he used constantly.

Helps Needful for Practical Men

We all know that an examination is a bugbear to the practical mining man, who generally becomes so worked up and nervous when taking the examination that he is wholly unfit to do himself justice. Nine times out of ten the practical mining man has not had the benefit of an early education, but his experience, it will generally be admitted, makes him the best fitted to fill the position. On this account something is needed to assist these men to answer the theoretical questions asked in examinations.

Allow me to suggest that, instead of permitting the use of textbooks by candidates, examining boards should give the formula or the constant needed for the solution of the question, in each case. This would give all candidates the same chance. When the man has become more familiar with arithmetic and understands the symbols used in formulas, he could, like the old foreman I mentioned, always carry a pocket textbook.

It is useless to claim that a knowledge of the theory of mining is not required of mine foremen. A mine foreman should be able to apply the theory and principles involved in practice in order to be successful in his capacity. Permit me to cite here an interesting circumstance that

occurred during an anthracite examination last spring, when two young men took the examination for mine foreman.

One of these candidates was a student of mining who desired a certificate, not for the purpose of securing a position as foreman of a mine, but to enable him to become a teacher in a mining school. He had never seen the inside of a mine. The other candidate was a practical mining man, 34 years of age, who had had 23 years' experience in mines. He was fairly good in arithmetic, understood the use of formulas and constants, but had not memorized them and could not always twist them to fit the case.

As a result of the examination, the student received a first-class mine-foreman's certificate, while the practical man was only granted a certificate to act as assistant mine foreman, because of his failure to answer satisfactorily the theoretical questions asked in the examination. It is unnecessary to say that had the practical man been given a guide, he could have made the same mark in examination as the student. I want to ask, which of these two men would make the best foreman to have charge of a mine? F. B. H.

Plymouth, Penn.

Testing Mine-Rescue Apparatus

Letter No. 1—In connection with the unfortunate death of L. M. Jones, engineer in charge of the rescue car at the Barrackville mine explosion, Oct. 19, 1916, the testing of breathing apparatus is of the greatest interest and importance. Mr. Jones was well known as a capable mining man and as being particularly expert in the use of mine-rescue apparatus. It is hoped that accurate details of how he was overcome will soon be forthcoming. Permit me to suggest that a practical discussion of the methods of testing different types of rescue apparatus and their use in the mines would be exceedingly valuable to those whose lives are often endangered by imperfections in the apparatus worn.

The two types of breathing apparatus in most common use are the Draeger and the Proto-Fleuss apparatus. In his excellent article on the testing of mine-rescue appliances, *Coal Age*, Nov. 25, p. 875, C. E. Pettibone explains at length the manner of testing the Draeger apparatus, but says little in regard to the Fleuss apparatus, which I understand Mr. Jones was wearing at the time he was overcome. I have worn both of these types myself and have some knowledge of them.

Danger of a Possible Negative Pressure

Mr. Pettibone speaks of both the positive pressure and the negative pressure experienced in the use of such apparatus. The negative pressure is what every wearer of the apparatus fears most. The old type of Draeger apparatus had its full share of negative pressure. In his report on the different types of apparatus Dr. J. S. Haldane states that it is possible, in the use of an apparatus with a negative pressure, for a man to work until he falls down overcome and not be at all conscious that anything is wrong. When the wearer is surrounded by a poisonous atmosphere containing carbon monoxide, a very small leak in the apparatus will quickly prove fatal.

The Proto-Fleuss is so constructed that the pressure is always positive. Notwithstanding this fact, every part of the apparatus should be carefully examined and tested before it is worn. This is gravely important when entering a dangerous place in a mine. Let me suggest that in the testing of a Fleuss apparatus the breathing bag should be examined on both the inner and outer compartments. The openings into the bag should be inspected to see that they are clean and clear of any obstruction. The two valves on the breathing tube should then be taken apart to see that they are clean, and the release valve should be taken out and carefully examined. All joints in the apparatus should be made tight. The reducing valve should be tested frequently with a testing gage.

Test Apparatus for Leaks Before Wearing

When the wearer has put on the apparatus, he should proceed to test it thoroughly in the following manner: Before turning on the oxygen or closing the nose, he should take a long breath and blow into the bag. Then placing the tongue in the opening in the mouthpiece to hold what is in the bag, take another breath, inhaling through the nose, and again blow into the bag, repeating this until the bag is fully inflated. The gradual collapse of the bag will reveal the presence of any leaks.

This subject is of growing importance because, under the compensation law, in many states coal companies are compelled to maintain first-aid and mine-rescue corps. Many of the men composing these corps have little or no training in the use of such apparatus and the attending danger when it is in any way imperfect. Many of the larger companies had already maintained fully equipped rescue teams before the passage of the compensation law. The majority of the men composing these teams are well trained for the work, and it is natural that they should all be anxious to learn of the details connected with the death of Mr. Jones, and to know how it was that he was overcome when his capability was well known and acknowledged by all. Allow me to express the hope that much good will result from the discussion of this important subject in *Coal Age*. Safety First.

Greensburg, Penn.

Seasonal Mine Explosions

Letter No. 3—That mine explosions are most likely to occur in the winter season has been so generally acknowledged by mining men and the claim seemingly proved by the records of great disasters, that I have been inclined to accept the statement as an axiom, and it was with great interest that I read the timely article by J. W. Powell entitled "The Season of Explosions," *Coal Age*, Sept. 16, p. 458.

In his letter, Nov. 18, p. 853, John Rose expresses the opinion that the history of explosions would not bear out this theory, and I resolved to look up the records. I did not limit my search to a period of 35 or 40 years back, as suggested by Mr. Rose, but included all such disasters in which five or more men were killed in the coal mines of the United States from the beginning of the coal industry in this country, covering a period from 1839 to August, 1912. The records to which I referred are those published by the Federal Bureau of Mines, Bulletin 69, pages 45-48, which I believe are the most complete and reliable data available at this time. It is unnecessary, and would require too much space, to duplicate this record here. But, to summarize the 187 explosions there given, I have

tabulated the number that occurred in each of the 12 months of the year. They are as follows:

January	27	May	15	September	6
February	19	June	8	October	19
March	26	July	9	November	20
April	16	August	5	December	17

Now, taking from this summary showing the number of mine explosions in each month the total number occurring in each of the four seasons of the year, we find as follows:

Spring (March-May)	57
Summer (June-August)	22
Fall (September-November)	45
Winter (December-February)	63

The record further shows an increase during the fall months, from six explosions in September to 20 explosions in November, this increase gaining with the approach of winter. On the other hand, we observe a corresponding decrease in the spring months from 26 explosions in March to 15 explosions in May, this decrease occurring with the approach of the summer season. Finally, the warm summer months show the smallest number (22) of explosions occurring in the mines, while the cold winter months reveal the largest number (63) recorded for any of the four seasons of the year. It seems to me that these figures tend to confirm the statement that the winter season is the one in which mine explosions are most frequent.

But, passing this historical record of the frequency of explosions with respect to seasonal changes, let us examine briefly into the causes of these dread occurrences that exact such a heavy toll of human life. Were it not for the presence of dust in mines, gas explosions would generally prove to be local. The fact is well known that the capacity of air for carrying moisture decreases with the fall of its temperature and, as a consequence, the cold air of winter carries a comparatively small amount of moisture into the mine. Then, the temperature of the air rising in the mine workings makes it capable of absorbing a large amount of moisture from the workings, which renders them dry and dusty.

What follows this absorption of moisture in the mine? The dry dust is easily thrown into the air by the disturbances common to the operation of the mine, with the result that the dust-laden air of the mine then serves to propagate any local explosion of gas and to produce a destructive mine explosion, when, but for this dry condition of the mine in winter, only a local and comparatively harmless explosion of gas would have occurred. My conclusion is that the colder winter months are more conducive to the frequency of disastrous mine explosions than the warmer months of summer.

Montgomery, W. Va. J. J. Bourquin.

Gasoline Motors in Mines

Letter No. 6—In this discussion little has been said regarding the influence that the design of the engine and its mechanical perfection have upon the production of the noxious gases in the discharge. When an engine is working badly, the motorman at once suspects the cause and tries to remedy the trouble by readjusting the carburetor, with the result that the engine then uses an over-rich mixture.

My experience with these machines has taught me that the primary cause of trouble lies in the lack of proper design in the engine. For example, it can be truthfully stated that the power of a gasoline engine depends directly upon its capacity for free air, in which respect it resembles a boiler furnace. All gasoline engines have a combustion space in the end of the cylinder, the volume of which is approximately 20 per cent. of the piston displacement. Thus, if the space swept by the piston, in making a single stroke, is 100 cu.in., the combustion space is or should be 20 cu.in., making the total cylinder volume 120 cu.in.

The ordinary gasoline engine is so constructed that the burnt gases following the explosion are not completely exhausted from the cylinder and, as a result, there remains a residue of these gases in the combustion space at the commencement of each following stroke. The mixture of these burnt gases with the new charge greatly modifies the combustion, with the result that the latter is incomplete and a larger percentage of carbon monoxide is present in the exhaust of the engine.

Proper Design Will Overcome Motor Troubles

Let me suggest here, that it is possible to so design a four-cycle scavenging engine as to practically overcome this difficulty and increase the efficiency of the engine and its power. Of course, this would increase the cost of construction; but, in my opinion, the extra expense would be justified by the results obtained.

It is nothing uncommon to find on the scrap pile at a mine where three or four of these machines are employed, a number of wornout pistons, broken piston rings, scored cylinders and discarded valves. I have learned by experience that these bad-order parts are generally kept in service for days and sometimes for weeks after they should have been discarded and the engine overhauled. It is therefore little wonder that these engines frequently make a bad showing.

The facts I have stated emphasize the necessity of employing an expert mechanic, whose duty it would be to examine and make all necessary repairs wherever this type of motor is employed. But even then it must be admitted that this would not entirely eliminate the troubles, which, as I have said, are the result of poor design and imperfect workmanship.

Other Factors Affecting Gasoline Motors

Another element affecting the proper working of a gasoline engine is its lubrication. In my opinion, flooded lubrication should never be used in a horizontal type of engine. Experience shows that such lubrication will cause the engine to consume from two to three quarts of a high priced lubricating oil, where a single quart should be sufficient. The greater part of this oil finds its way past the piston and is burned with the charge, contaminating the exhaust gases and rendering them more noxious than if the oil did not reach the combustion space. Many motormen can testify to the smarting of the eyes caused by the burning of this oil in the engine cylinders. This is especially true when operating in a place where the ventilation is not good.

Still another point that has not been mentioned as yet is the effect that gasoline locomotives have upon the temperature of the mine air. When these locomotives are operated on the intake aircourse, they may cause an increase of from two to five degrees in the temperature of the air in a mine already warm, which is a matter to be considered in connection with mine safety.

While I am satisfied that, under certain conditions, gasoline engines can be employed to advantage for haulage

in mines, I firmly believe that these engines should be improved and made more durable. I believe that most operators would not hesitate to pay $500 more for a locomotive of this type, if they felt that the machine could be depended on for as regular service as electric locomotives furnish.

W. F. SHUTT.

Briceville, Tenn.

Storage-Battery Locomotives

Letter No. 2—I have just read the letter regarding the use of storage-battery locomotives, by Jesse Hamilton, *Coal Age*, Dec. 2, p. 937, and am glad to note that he agrees with me in regard to the future of this method of hauling coal.

Mr. Hamilton seems to have ideal conditions for a storage-battery locomotive and has certainly got excellent results. However, my experience has shown that under the most adverse conditions the storage-battery machine has made the best showing in comparison with other methods.

I call to mind a mine where a storage-battery locomotive is gathering coal from rooms where the grade is 17 per cent. against the loads. Of course, it is necessary here to use a sanded rail. In that place, before the advent of the storage-battery locomotive, it was necessary to work three mules in tandem to handle a single car; one six-ton storage-battery machine now handles 85 to 100 cars a day, replacing about 12 mules and 4 drivers. It is easy to figure the saving in this case.

Thus, under the ideal conditions described by Mr. Hamilton, as well as under the extremely adverse conditions I have just cited, this type of locomotive has proved to be the most economical.

Mr. Hamilton states that his locomotive will not stand up longer than 7 hr. when contending with long and heavy grades, but this is no fault of the locomotive as the capacity is determined by the size of the battery. It is simply a question of adding sufficient battery to do a full day's work. I know of one mine in this district in which a six-ton motor is hauling 300 tons a day a distance of 3,500 ft. where the grade is 3 per cent. against the loads, and they always have sufficient power for a full 9-hr. day on a single charge.

Permit me to express here my belief that the storage-battery locomotive has come to stay and that the day is not far distant when there will be no trolley wires in mines.

Ironton, Ohio. G. E. ALLOWAY.

Bonus System in Mining

Letter No. 6—I have been interested in the discussion of this subject, not because I agree with its advocates, but rather to see if they could produce a plan that would appeal to me as practicable. My experience in mining does not recommend to me the system of giving bonuses in order to secure proper and efficient work in the mine.

For example, I recall one instance where a bonus of 5c. a ton was to be paid to all miners who loaded only clean coal, free from slate, bone and sulphur. For a single week the plan worked well, all the miners loading clean coal. But the result was that the company was compelled to continue the payment of this bonus, notwithstanding the coal was not always clean, as a strike threatened any attempt to withdraw the payment of the extra 5c. a ton.

At another time, the demand being urgent for rapid development of entries in the mine, I agreed to pay $2.25 per yard to all entry drivers making over 18 yd. per month, while the regular rate of $2 per yard was to be paid when the work fell short of this amount. The result was that there was a continual wrangle on measuring day. The men making less than 18 yd. would claim that they did not get cars enough to load their coal; or the place made water, which delayed them. One man claimed he had been sick a few days and that sickness should not be counted against him. On the whole, about one-fourth of the men succeeded in drawing the bonus and the balance were greatly dissatisfied, believing that they did not have a square deal.

Bonus To Drivers Caused Trouble

In another instance all drivers were to receive 25c. extra a day when the number of cars hauled to the bottom exceeded a fixed limit. This arrangement did not prove satisfactory, as those drivers who failed to get the bonus always had a ready excuse and blamed the trouble to a "bum mule," cars off the track, or miners not loading their cars. In fact the fault was any and everybody's but their own.

These and other like instances, of which I could give a large number, have convinced me that the bonus system cannot be applied successfully to mining. I would say that the reason is that every mine worker is dependent to a certain extent on someone else and this dependency affords them many loopholes for shifting the blame to other shoulders. If the blame cannot be placed on other men, fault is found with the changed conditions in the mine, for which they claim they are not responsible.

Payment for Tonnage and Yardage Better Than Any Bonus System

Permit me to suggest that, in my opinion, by far the best method to adopt is to pay the miners a fixed price for their coal and yardage. Let them understand that the coal must be kept clean and the entries driven a certain width and height and hold them to the contract. A day or so before measuring up the places, notify any men whose places are short of these requirements that their work will not be measured until it is in proper condition as required by the agreement.

If the system of docking cars in proportion to the amount of dirt contained in the coal does not remedy that trouble, it is better to discharge the men who persist in sending dirty coal to the tipple than to permit them to set a bad example to other miners. The loss of a few men will serve to maintain the discipline required in the mine and will not prove so great as the loss of future orders from the shipment of dirty coal.

If a dayman does not give satisfaction in the proper performance of his work, shift him over to mining coal and put another man in his place. He will then be obliged to work out his own salvation and will suffer for his own shortcomings.

Permit me to urge in closing that when a mine cannot be run successfully without the payment of bonuses for every little thing done, it is about time that there was a change made in the management, as I believe that is where the real trouble lies. Treat men fairly, pay them suitable wages, commend them for good work, advise and discipline them when necessary; but, by all

means, hold them right to the mark, as it is only human nature for men to take the whole hand when given the little finger. W. R. JONES.

Ohiopyle, Penn.

Letter No. 7—In considering the application of the bonus system to coal mining, it is well to remember that there are two distinct classes of labor employed in the mines: (1) The miner who digs and loads the coal and who is commonly paid what may be called a piece rate, or a specified amount per ton or per car of coal loaded; (2) All other employees employed in and about the mines and engaged either in handling the coal from the working face until it is loaded ready for shipment or in doing other necessary work in the mines. Workers of this class are usually paid a flat rate per day, regardless of the amount of coal handled. By far the larger proportion of mine workers belong to the class first mentioned.

In order to intelligently discuss this question, let us glance for a moment at the comparative advantages and disadvantages in respect to the different systems in use for the compensation of labor in mining. There is but one law that governs all forms of compensation and guarantees justice to both employer and employed. Briefly expressed, this law is: Payment for work done shall be proportionate to performance. It will be well to bear in mind that the nearer we approach to this principle, the more just will be the compensation of workers.

COMPARING DIFFERENT SYSTEMS OF PAYMENT FOR LABOR

Where labor is classified into groups and each individual is paid a fixed wage dependent on the group to which he belongs and without regard to his individual efficiency in the performance of his tasks the system is wrong in principle, because it does not consider the general law just mentioned that work shall be paid for in proportion to performance. Under such a system the most incompetent or indifferent worker is rewarded equally with the most efficient and conscientious workman of his class. Such a system discourages ambition and puts a premium on shiftlessness.

The piece-rate system of compensation rewards every worker in proportion to his performance. The system requires, however, that the work performed shall be of a character that can be accurately measured. This system is clearly ideal in principle, and a bonus system presents no advantage in respect to the justice of the compensation, since in either case the pay of each worker is in proportion to his performance, and that will depend on his competency, efficiency and faithfulness. Hence, the piece-rate system, in strong contrast to the wage-scale previously mentioned, encourages ambition and puts a premium on industry.

The chief characteristic of the bonus system is that the worker is paid a bonus, or piece rate, in addition to his specified daily wage, the bonus being based on the excess performance over an agreed minimum amount. The system is, in fact, a piece-rate system but having a guaranteed minimum wage. It is apparent that it possesses no superiority over the piece-rate system, of which it is a modification.

The bonus system offers an inducement to the miner to gain a somewhat increased rate for all coal loaded in excess of a specified tonnage. It likewise offers a bonus to all wage earners whose work can be accurately measured and is in excess of a specified amount. The system, however, possesses the decided disadvantage that, owing to conditions varying in different parts of the mine and different classes of work, individual workers have not the same opportunities to earn the bonus. The practical effect will naturally be, therefore, to discourage many competent and industrious workers who are handicapped by various conditions.

CONDITIONS AFFECTING CHOICE OF METHOD

It must be admitted, however, that there are conditions that would recommend the payment of a bonus. For example, in the training of new men, who because of their lack of experience are unable to make a living wage in the mines, a bonus to cover this deficiency will serve to encourage the worker to continue until he is competent to earn a normal wage.

On the other hand, while the piece-rate system is ideal in principle, it does not escape being open to abuses. For example, owing to favorable conditions in the mine, the miners working therein may be earning an amount largely in excess of the earnings in adjacent mines and the management, realizing this fact and knowing its ability to secure plenty of workers, is tempted to cut the rate. At once the miners are discouraged and argue, "What's the use of our trying to put out more coal when the company will simply reduce the rate and we are unable to earn any more money than before the rate was cut?"

Again, the management of a mine may improve the equipment and invest a considerable sum in the installation of a new type of undercutting machine, whereby it is possible for the miner to greatly increase his output. Here is a legitimate excuse for the company to reduce the rate; but will the miner accede willingly to such a reduction? In many cases, on the contrary, he will fight the installation of the new machines. It is clear that the bonus system offers no remedy for these conditions.

CHIEF HINDRANCE TO BONUS SYSTEM

While there is no doubt that the offering of a bonus will serve to speed up an operation, the difficulty is always present of accurately measuring the performance of men engaged in different classes of work in mining. In contrast with the wage system, it encourages competition among the workers. But the statement recently made in *Coal Age*, Nov. 11, p. 816, to the effect that "when properly adjusted its effect cannot be to materially increase or decrease the margin between the cost of production and the selling price of the coal," to my mind, is entirely erroneous. It is a common misconception to suppose that, because the miner's earnings are increased 50 per cent., and the output of the mine increased in like proportion, the only gain to the company is an increased shipment of coal. But the fact that the overhead charges are less in proportion naturally increases the net profits of the company a large amount.

In closing, permit me to say that whether the merits of the bonus system will be able to overcome the obstacles to its adoption yet remains to be seen. At this time when conditions demand the making of extraordinary efforts to increase the production of coal, the suggestion of any practical means to attain this end is well worthy of attention and study by operators and employees alike.

Santo Tomas, Tex. P. L. MATHEWS.

Inquiries of General Interest

Loading Chutes, Steep Pitches

Will you kindly explain the construction of a loading chute in a highly inclined coal seam, say where the inclination of the seam reaches 45 deg. I believe that sufficient attention has not been given to this matter in a mine with which I am acquainted and, as a result, there is considerable delay in the loading of cars, to say nothing of the shortage of air in many of the working places, owing to the leaking of the air-current through the chutes into the airway above. I shall greatly appreciate what information you can give me along this line.

———, Penn. MINING ENGINEER.

In order to avoid the trouble experienced in loading coal from an improperly arranged chute in a steeply pitching seam, it is important that the chute be constructed with special care and in such a manner as to comply with certain necessary regulations. The following description of the construction of a loading chute under the conditions mentioned by this correspondent has been sent us by Forney L. Parker, Assistant Mine Foreman, Pottsville, Penn., who gives some valuable suggestions in this regard. They are as follows:

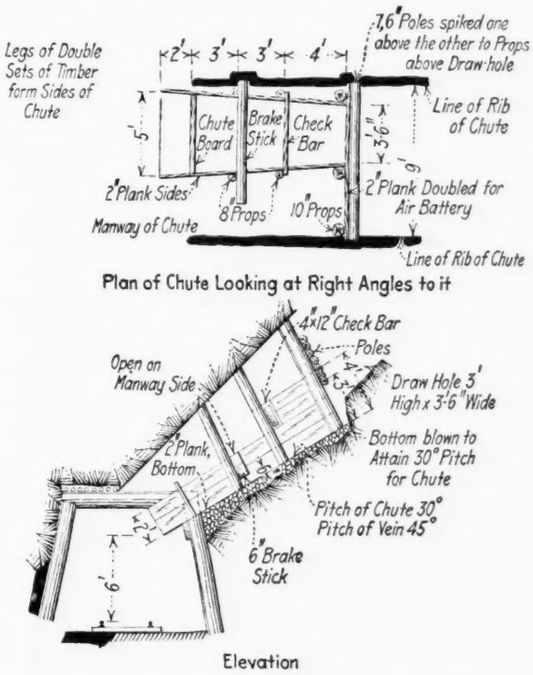
In the construction of a loading chute on a steep pitch, there are five essential things to be observed: (1) The pitch of the chute should vary from 30 to 35 deg., depending on the grade of coal to be loaded. (2) The battery should be air-tight so as to prevent the short-circuiting of the air at that point, and strong enough to withstand a heavy rush of coal. (3) The chute should be provided with both a checkbar and a brake-stick for the protection of the loaders. (4) There should be a sufficient clearance between the bottom of the chute and the top of the car to allow for the "topping" of the coal and to make suitable provision for the possible heaving of the road, so that it will not be necessary to alter the chute, should this occur. (5) To insure a reliable job, the work should be done by company men and not contracted.

By adopting efficient standards to govern the work, many avoidable delays and unnecessary accidents will be prevented. With a good working chute, two loaders can load a car in 4 min., the driver or motorman assisting to shift the car as required when loading. The quick loading of cars is particularly desirable when the working places are at a considerable distance from the shaft or slope bottom, in which case a poorly constructed chute will prove a thorn in the flesh to all concerned.

As indicated in the accompanying figure, the pitch of the chute should average about 30 deg., although with certain grades of coal it may be necessary to give it a somewhat greater inclination, to cause the coal to slide readily down the pitch. In thin seams, where the pitch of the seam exceeds that required for the chute, it may be necessary to blow the bottom rock, as indicated in the figure.

The time required for one good repair man and helper to build the chute shown in the figure, with rock bottom and top, assuming all material is on gangway near chute, will approximate 2½ or 3 shifts of 8 hr. each. This time includes the entire work of standing and wedging posts, fitting and spiking planks forming sides of chute and battery and plastering all joints to make air-tight.

Having prepared the seam for the proper length and pitch of the chute, the work of construction is commenced by standing four 8-in. props in place to support the sides of the chute. These posts are given a good foothold in the floor and are tightly wedged at the roof. The



LOADING CHUTE AND AIR BATTERY ON A STEEP PITCH

same posts also serve to support the brake-stick and the checkbar, as shown in the figure.

An air-tight battery is then constructed at the head of the chute by setting in place three 10-in. props, giving each a firm foothold in the floor and wedging the post tightly at the roof. A double thickness of 2-in. plank is spiked on the upper side of the posts, making an air-tight brattice, but providing a drawhole 3 ft. high and 3 ft. 6 in. wide. The ends of the planking are butted into the coal on each rib and the joints made air-tight with a plaster composed of a mixture of lime and sifted coal dirt.

As shown in the figure, in order to provide against a sudden rush of large coal destroying the battery, it is strengthened by spiking seven 6-in. poles on the upper side of the battery. The checkbar and the brake-stick insure the safety of the loaders. The checkbar is removable, however, so as to permit the larger pieces of coal to pass. Also, the brake-stick is set in an open cut on the manway side for the same reason. The loading is usually done by two men. While one man operates the brake-stick, the other opens and closes the chute.

Examination Questions

Mine Bosses' Examination in Indiana, September, 1916

(Selected Questions)

Ques.—(a) What is to be taken into consideration to determine the size of pillars to be left in a mine? (b) What are the legal and necessary requirements to properly ventilate coal mines in Indiana? (c) What should be the minimum amount of air required in a split in which 50 persons and two mules are employed?

Ans.—(a) The size of pillars to be left between rooms and entries in a mine is determined primarily by the depth and inclination of the seam, width of opening, thickness and character of the coal, and the nature of the roof and floor. Regard must also be had to the system of mining adopted, the length of time the pillars are to remain standing before being withdrawn and the amount of surface damage that is likely to occur.

(b) The Indiana mining laws require a circulation of a sufficient amount of air, specified as not to be less than 100 cu.ft. per min. for each person and 300 cu.ft. per min. for each animal employed in the mine, the measurement to be taken at the foot of the downcast. The law also provides that as much more air shall be circulated throughout the mine as the circumstances may require to keep it free from gas and in a fit condition for work therein.

The volume of air must be sufficient to render harmless all noxious or dangerous gases generated in the mine, which must be carefully examined by a competent fireboss, with a safety lamp, immediately before each shift. The fireboss must leave evidence of his presence at the face of each place examined, and no one is permitted to enter the mine or any part of it where gas is generated, until it has been examined by the fireboss and reported safe for work.

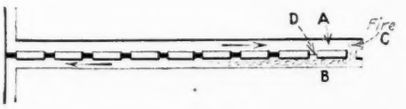
Breakthroughs must be made in all rooms at least every 45 ft. and closed and made air-tight, except the last breakthrough at the face of the room. The mine boss must measure the air current, at least once a week, at the inlet and outlet of the mine and at or near the face of each entry and record such measurements in a book kept for that purpose. The first day of each month he must mail to the mine inspector a true copy of the air measurements, also stating the number of persons employed, the number of mules or horses, and the number of days worked in each month. If a mine furnace is used for ventilation, it must be so constructed as to prevent fire being communicated to the mine or the shaft.

(c) The law provides that a separate air current shall be supplied to at least every 50 persons and gives the mine inspector authority to order a separate current for a smaller number of men where conditions make it necessary. The air required for 50 persons and two mules is $50 \times 100 + 2 \times 300 = 5{,}600$ cu.ft. per min.

Ques.—In sealing a pair of entries that generates some gas, after considering ventilation and breakthroughs, how would you proceed? Show by sketch.

Ans.—There would seldom be any reason for sealing off a pair of entries generating some gas, unless fire existed in the entries and it was decided to extinguish the fire by sealing off the openings. Referring to the accompanying figure, and assuming that a fire is burning in the coal at *C*, at the head of the intake entry, the first step is to short-circuit the air by opening a stopping at *D* or further back if it is not possible to approach so closely to the fire owing to the heat and gases produced.

Having cut off a large portion of the air from the fire by opening this stopping, the work of building a permanent stopping, at some point *A* on the intake, inby from



the stopping just removed, should be commenced. Before completing this stopping at *A*, another stopping should be started and built on the return airway, at a point *B* just inby of the open crosscut. This may require the erection of a temporary brattice to protect the workmen.

The return stopping should be carried up to the roof and closed first, after which the stopping on the intake should be closed. By this means, the burnt gases of the fire are confined and, being largely incombustible, will help to extinguish the fire. If the intake stopping is closed first, there is liable to be formed a highly explosive mixture behind that stopping and a disastrous explosion may result.

Ques.—In driving entries that are approaching old workings known or supposed to contain dangerous accumulations of water or gas, what precautions must be taken? State fully.

Ans.—Entries or headings should be driven narrow when approaching old workings that may contain water or gas. One or more drillholes should be kept at least 20 ft. in advance of the face of each heading, and flank-holes should be driven at an angle of 45 deg. in the outer rib of the heading, at distances of 8 or 10 ft. apart. A careful watch must be kept to observe any increase of water or gas in the strata. Only safety lamps are used and plugs must be kept in readiness to stop the flow of water or gas when struck. Where conditions are particularly dangerous, one heading of the pair is pushed forward in advance of the other entry, the air being conducted to the face by a line of brattice carried along one rib of the heading.

Ques.—In the event of a mine fire what precautions would you take to protect the workmen in extinguishing the same?

Ans.—The fire must be approached from the intake side and, under no consideration, must the men be exposed to the gases in the return current, as these are frequently very poisonous. Every precaution must be taken against a possible fall of roof. Only experienced men should be employed in the work of extinguishing a fire. The men should be instructed not to advance beyond the fresh air, which, as far as possible, must be kept from the fire.

Coal and Coke News

Washington, D. C.

With the opening of Congress many demands were made for the imposition of an export embargo upon foodstuffs. This has led the Administration to renewed activity to find out the real causes for the recent advances in the cost of foods and coal. The investigations are being made under the direction of the Department of Justice and it is reported that many instances of restraints or agreements among merchants have been discovered which will likely afford the basis for suits under the anti-trust laws.

The reports which are at present current indicate that the investigations have dealt to a large extent with the retail price of coal, and it has been intimated that considerable evidence has been gathered to indicate that there have been illegal practices among certain coal dealers, who have taken advantage of the scarcity caused by war demands and advanced the price of coal to the consumers.

Department of Justice officials have held a number of conferences with the members of the Federal Trade Commission and District Attorney Anderson of Boston has been placed in charge of the investigation work. One of the suggestions advanced and seriously considered was the advisability of calling grand juries in the larger cities to take testimony in this matter. About 50 picked investigators of the Department's bureau of investigation were reported to be at work throughout the country gathering data which will determine the Attorney General's course of action.

It was contended that the real basic causes for the advance in prices were three in number. The work of the investigators will be directed along these lines:

1. Determination of the actual causes of the rapid rise in foodstuffs and coal, whether it was due to natural economic laws, to the unwarranted action of individual dealers and producers in advancing prices, or whether there exists agreements among groups of dealers or producers to advance prices.

2. Vigorous prosecution of persons or firms, if any, who by violation of existing laws in making agreements to raise prices or otherwise, have contributed to the upward trend of prices.

3. Enactment of legislation to remedy the present situation and to prevent its recurrence.

It is said that doubt no longer exists as to whether there had been combinations of men to advance coal prices, and that effective means to punish those who have violated the law in contributing to the rises are being studied. One of the chief problems facing officials is how to reach the men under suspicion without enabling some of them to obtain immunity by testifying before grand juries or other inquisitorial bodies.

The Interstate Commerce Commission began work on a mass of information relating to car shortage and coal shipments for use in contemplated prosecutions. The two situations, it was said, are closely related.

Indications are that the Department of Justice will concentrate its immediate activities on inquiring into the operations of coal dealers and minor railroad employees in the Middle West, with a view to determining whether cars were deliberately withdrawn from their normal channels to aid in creating an artificially high level in prices. These inquiries, it was said, will be conducted chiefly in Detroit, Toledo, Cincinnati, Chicago and Cleveland.

Interstate Commerce Commission statistics are understood to show that at the height of the rise in coal prices, at a time when there was no apparent shortage in the supply, hundreds of loaded cars stood untouched in railroad yards in the Middle West. Whether this coal was being held for a further rise by concerted action of its owners is under investigation.

The only penalty for holding these shipments, it was said, was a demurrage charge by the railroads. Higher demurrage rates, running up to $5 a car on and after the sixth day of delivery, which become effective Dec. 15, and increased per diem charges to roads for the use of the cars of other companies, are expected by officials to afford a measure of relief from car shortage and high prices.

Some cars, investigation is said to have disclosed, have been held loaded from four to six weeks, and one case has been reported where a car has been held, loaded, 106 days.

No Protest Will Be Made

According to the best information available, information coming from high authorities in the Government, the United States will make no general protest against the practice of refusing bunker coal at British ports to vessels not conserving Allied interests. State Department officials are understood to feel that the matter is one of purely domestic control, even though it may seriously affect neutral shipping. Coal carried in British ships and stored either in British possessions or bunkers under British lease, it is held, cannot be claimed for neutral ships under any established principle of international law.

The protests that the United States has already addressed to Great Britain on the subject have been based entirely upon individual cases, where it has been feared that there might be undue discrimination. It was explained that the coaling privilege rests only on international comity, but that the matter of equal treatment is one with which neutral governments can properly concern themselves.

The great possibilities of damage to American trade which this control of coaling stations has given to Great Britain has led some officials to suggest the advisability of American-controlled coaling stations in various parts of the world. Such a plan would have the support of the State and Navy Departments and probably of the Commerce Department. It may be referred to the new Federal Shipping Board as one of the first problems that will face that body upon its organization.

The question is regarded as almost entirely commercial, rather than naval, and it is assumed that if a plan to provide American coaling stations were carried out it would be through some semi-official, rather than through an actual Government body.

It was pointed out that the navy, with 17 colliers and two oil ships in commission and five oil ships building, is adequately equipped for any campaign that can be foreseen, although if the Panama Canal were to be blocked the fleet might be somewhat embarrassed by the lack of fuel facilities at the southern tip of South America.

Byproduct Treatment of Lignite

By extending the byproduct principle of coke-making to lignites, profitable exploitation has been accomplished which has impressed the Geological Survey with its possibilities. The fact that the American Coal Refining Co., of Denver, has found it possible to recover valuable tars and oils from lignite, as well as a residue, which practically is the equivalent of anthracite in composition, leads to the belief that the process can be applied successfully to the brown lignites of North Dakota and eastern Montana, as well as to the black lignites of Colorado.

The larger sizes of the residue are being sold in direct competition with anthracite. The dust and fine sizes are being briquetted. One of the oils, which is a byproduct of the process, is becoming increasingly popular for use in connection with flotation. The demand for this oil is expected to add materially to the profit which can be earned in treating lignite.

HARRISBURG, PENN.

Refunds of about $90,000 will be given to insurers in the State Workman's Insurance Fund in the form of credits on payment of premiums for 1917 by the board of managers of the state fund according to an announcement made on Dec. 9 The refund which is styled a dividend, will be 10 per cent. for coal operators who insured their employers' liability in the fund and 15 per cent. on all commercial and industrial risks insured in the fund. The refund will not apply to the $5 policies, which were written at the minimum permitted by the state law.

The fund office issued a statement on the above date in which it set forth that the refund was based on the experience of the fund for the first 11 months of the year. This statement says in part:

"During the first 11 months of 1916, the state fund paid to injured employees, whose employers were insured in the state fund, a total of $116,309.74. During the same time the fund set aside as financial reserve to carry these compensation claims of injured employees or dependents to maturity, the amount of $309,597.27.

As an additional safeguard to protect the fund against the hazards of catastrophes the fund has set aside from its 1916 premium income, $57,917.14. This safeguard has been adopted in addition to reinsuring the catastrophe hazard of the fund.

After consideration of all the necessary items, the statement showed on Nov. 30 a surplus of $122,494.71, from which the dividend declared may be distributed.

The investments of the state funds premium income have been made almost exclusively in public improvement bonds of municipalities, boroughs and school districts in the State of Pennsylvania. These investments aggregate $492,823 from which an income of $17,507.98 has been derived."

The State Workmen's Insurance Fund Board, comprised of State Treasurer R. K. Young, chairman; J. Denny O'Neil, insurance commissioner, and John Price Jackson, commissioner of labor and industry, has authorized Albert L. Allen, assistant manager of the state fund to send before the first of the year to all state fund policyholders the following statement:

"The State Workmen's Insurance Board has authorized the management of the State Workmen's Insurance Fund to announce the following dividends will be declared, subject to approval by the insurance commissioner:

Commercial and industrial risks, 15 per cent.
Coal mining risks, 10 per cent.

It is impossible for us to declare this dividend authentically at this time as the reserves for the full year cannot be computed until after Jan. 1 and it is probable that the insurance commissioner will require a certain period before approving our reserves which are set aside to carry outstanding claims to maturity."

These dividends, considered with the initial premium rate of the state fund which is 10 per cent. lower than that of other insurance carriers, makes the cost to state fund policy holders from 20 to 25 per cent. less than the cost of casualty companies.

PENNSYLVANIA

Anthracite

Minersville—The Pine Hill Coal Co. has issued an announcement providing for profit-sharing by its miners and other employees through payment of a bonus on the tonnage mined. The bonus for November will be 5 per cent., equivalent to an increase of wages to that amount. The colliery is owned by Clarence B. and E. B. Sturgiss, of New York. The company makes one condition, that all who benefit shall not lose more than two working days per month, unless excused by the mine foreman for illness or accident.

Wilkes-Barre—The coal tonnage was reduced by thousands of tons on Dec. 8, by the celebration of the Feast of the Immaculate Conception generally throughout the coal fields. The collieries of the Lehigh & Wilkes-Barre, 20 collieries of the Lehigh Valley, 13 collieries of the Susquehanna Coal Co., many Delaware, Lackawanna & Western collieries and a number of the Delaware & Hudson Co., were idle.

Larksville—Operation of a breaker and mine on a night schedule was started here recently in order that the production of coal might not be decreased and for the purpose of keeping 1,200 men and boys in regular employment. First, a fire destroyed the No. 3 breaker of the Delaware & Hudson Co. The loss of this breaker and mine would have seriously affected coal production. The 1,200 employees would have been forced to seek positions elsewhere until the breaker could be rebuilt.

PENNSYLVANIA

Bituminous

Connellsville—The coke production for the Connellsville region for the week ending Dec. 2 was 419,377 tons, this being an increase of 11,208 tons over the preceding week. Shipments were 412,210 tons.

Charleroi—November coal shipments through Lock No. 4 nearly touched the high record of October, according to the lockmaster. Coal passing through the lock totaled 19,328,000 bu. The October shipments were 19,432,000 bu.

Pittsburgh—At a recent meeting in the rooms of the Chamber of Commerce, tentative plans were considered for the dedication of the new buildings of the U. S. Bureau of Mines. It is proposed to hold the exercises next September, and to bring together the leading technical and scientific men of the country, representatives of engineering organizations, coal miners and all affiliated with the mining industry.

Johnstown—The plant of the Lacolle Coal Co. at Lockport has been sold to the Clearfield Coal and Coke Co. for $301,000. It is reported that this plant is to be operated on a much larger scale.

Carrolltown—The Watkins Coal Co. is erecting a large power plant near this place, and will soon award a contract for the erection of about 20 houses in the early spring.

Smithtown—Joseph Leterbaum has sold 32 acres of coal on the outskirts of Smithton for $2,000 per acre to Thomas Francis, Samuel Hough, Samuel Smith, G. W. Morrow, and August Robertson, who will operate it under the name of the Smithton Coal and Coke Co. The tract is located along the Baltimore & Ohio R.R., and the purchasers plan immediate development.

Bergettstown—Coal mining by means of stripping will shortly be carried on in Washington County. A company which recently purchased over 2,000 acres of land in this section will begin operation of this kind within the next few weeks. All of the surface will be stripped from the coal, and the entire coal bed taken out. Tipples will be erected in the vicinity of Bergettstown.

Brownsville—Three hundred and fifty acres of a 1,200-acre tract of coal land, belonging to the Snowden Coal Co., have been leased by the Diamond Coal and Coke Co. It is said that more than $1,000,000 was paid for the lease.

Uniontown—The sale of 12,000 acres of Greene County coal lands, held by J. V. Thompson, banker and coal land speculator, to the H. C. Frick Coke Co., will be completed within a short time, the creditors' committee announced following a meeting on Dec. 8. The price is said to be between $6,000,000 and $7,000,000. Other negotiations are under way. The sales will net a sufficient equity above the debt on the tract to pay interest charges on the secured indebtedness. This is the largest coal land sale recorded in western Pennsylvania. Thompson, according to the appraisers, owned 58,403 acres of coal lands in Greene County alone, upon which he placed a valuation of $32,645,900. The sale of about one-fifth of his Green County holdings for one-fifth of the appraised valuation gives the creditors' committee encouragement.

Franklin—The Cambria Steel Co. is installing washrooms in various parts of this borough for the comfort and convenience of the employees. The latest installation of this kind is at mines Nos. 3 and 4, where a modern sanitary plant capable of taking care of about 200 men has been placed in operation. The plan is to furnish the men with a place where they can leave their mining clothes, scrub up and put on street attire so that they can go out from their work well dressed and clean.

WEST VIRGINIA

Beckley—The E. E. White Coal Co. at Glen White and Stotesbury has issued instructions that regardless of what the retail price of lump coal may reach, it will be sold from the company's chute at $1.50 per gross ton. Retailers are now charging $4 to $5 per ton for the fuel. Consequently, the E. E. White Co. is saving its employees and the people in its vicinity from $150 to $200 per day.

Charleston—The general offices of the Spruce Bend Coal Co., operating at Sharples in Boone County, will be established in Charleston. Samuel Butler, the general manager of the company, is making arrangements for office quarters.

Fairmont—The seals on the Jamison mine No. 7 have been concreted and are now holding, and it is thought that it may be unnecessary to flood the interior in order to conquer the fire which has been raging in the mine since Oct. 19, and which caused a second and third explosion, tearing away much of the machinery and property of the company. Bore holes leading into the mine from the bed of a stream have been started, but it is now thought that it may not be necessary to continue these to the mine.

Gary—The United States Coal and Coke Co., it is said, will build 400 new houses and make other improvements shortly.

Dry Branch—The Dry Branch Coal Co. at Malden will shortly make extensive improvements to its tipple, installing screens, etc.

ALABAMA

Birmingham—The De Bardeleben Coal Co. has taken over upward of 3,000 acres of coal lands in Brookwood seam on Warrior River and will within 30 days be shipping down the river to Mobile and New Orleans something like 25,000 tons a month. Coal washers and other equipment is being put in place. The shipping point will be called Warriver.

KENTUCKY

Whitesburg—The Superior Coal Co. operating a new development near Elkhorn City, is now shipping.

Hellier—The Edgewater Coal Co. is rushing work on miners' houses, coal tipples, the opening of additional mines, building coke ovens, etc. Hundreds of men are given employment in the new work.

Hazard—Charles Luttrell, manager of the Columbus Mining Co. mine No. 4, is installing two heavy electric motors which will drive the equipment of the mine. A double steel tipple is nearing completion. This is constructed so that all the output of No. 4 mine will be loaded from one side and the coal from Nos. 6 and 7 mines from the other, thus keeping the coal separate. Fourteen openings have been made and the mine will have an output of 5,000 tons a day when completed and fully operated. The railroad will shortly be up to this camp.

Hazard—The Swift Coal and Timber Co., with large land holdings in Hazard and Letcher counties, has been purchasing mineral land on Leatherwood Creek.

OHIO

Bellaire—The A. J. Morgan Coal Co., of Bellaire, has taken over the holdings of the Johnson Coal Co. at Pipe Creek. The Morgan company has purchased practically all of the stock of the Johnson company, but for the present the business will be conducted under the latter name. This deal includes 500 acres of coal and the mining property at Pipe Creek.

Shadyside—It is stated by officials of the company that all records of coal mining were recently broken at the Webb mine, when 2,583 tons of coal were produced in one day. It is expected that with better car supply an even greater tonnage or one approximating 3,000 tons per day will be secured.

Cadiz—Two new steam shovels are to be placed on Harrison County farms and three on Jefferson County farms not far from the Harrison County line in the near future. One of these will be located near Folks, by the Unity Coal Co., while the Witch Hazel Co. will place one near Piney Fork. In Jefferson County one shovel will be located near Adena, and the other two in the Wabash.

Columbus—Several important changes in the ownership and control of the Sunday Creek Coal Co. properties, located in the Hocking Valley, were announced late last week. The Buckeye Land and Railway Co., which together with the Ohio Land and Ry. Co., controls 23,000 acres of coal lands in the Hocking Valley were divorced from the Sunday Creek Coal Co. The deal dates from Dec. 1, 1916, but the announcement was not made until Dec. 9. Upon that date the Buckeye Land and Railway Co. took back its properties, which were under lease to the Sunday Creek Coal Co. This includes the Jobes mine at Jobes, Ohio, mine No. 9 at Carrington and many small operations scattered over its large acreage. It is the intention to open a number of other small mines under lease. It also takes over the jobbing business, formerly conducted by the Sunday Creek Coal Co. The Sunday Creek Coal Co. retains three mines, two at San Toy and No. 10. The offices of the Buckeye Land and Ry. Co. will be in the front on the ninth floor of the Outlook Building and the offices of the Sunday Creek Coal Co. will be in the rear on the same floor. J. S. Jones remains president of the Sunday Creek Coal Co., with John H. Winder, general manager, and R. W. Drake, sales manager. P. A. Coen, formerly sales manager of the Sunday Creek Coal Co., is president of the Buckeye Land and Railway Co. George K. Smith is secretary; C. C. Cook, treasurer; George F. Schwartz, general sales manager, and G. H. Dukes, manager of mines.

INDIANA

Linton—Every mine near Linton is running full time. The eight mines of the Vandalia Coal Co. are giving employment to at least 2,000 men. The miner's train was recently put back into service. This train was taken off nearly a year ago.

ILLINOIS

Edwardsville—The sheriff of Madison County has announced that the 360 saloons in all parts of this coal-mining county will be required to close their places of business on Sunday after Jan. 1 in compliance with the state law. Madison County is recognized as the most lawless mining community as regards liquor traffic in the State of Illinois. Some saloons run without any license at all, and the doors have never been closed Sundays or election days.

Carlinville—Two cases against the Consolidated Coal Co., of St. Louis, instituted under the Illinois statute requiring wash houses for miners, are set for trial at the present term of court. It is charged that the company has failed to comply with the statute. The company denies the charge. The difficulty is that the prosecuting officials and the mining company officials are not agreed as to the correct interpretation of the statute. Several other prosecutions have arisen from the same divergence of interpretation.

Springfield—Duncan McDonald, secreatry-treasurer of the United Mine Workers of Illinois, has ruled that the name of Frank Hefferly, who has withdrawn as a candidate for state president, cannot be scratched off of the ballots, which were printed before he withdrew. If any votes are cast for him they will have to be counted.

Personals

Martin Bolt, secretary of the Illinois Mining Institute, declares that every mine in Illinois would be in full operation if cars could be obtained.

E. W. Brandenburger, sales manager for the defunct Bald Eagle Mining Co., of St. Louis, has accepted a position in a like capacity for the Glendale Coal and Mining Co.

F. C. Hoy has resigned as superintendent of the Brothers Valley Coal Co. at Macdonaldton, Somerset County, Pennsylvania, and will devote his time to the operation of a mine of his own.

J. L. Mitchell, president and general manager of the Franklin Coal and Coke Co., with offices at Royalton, Ill., has leased quarters in the Syndicate Trust Bldg. in St. Louis for his general offices.

A. D. Macfarlane, of Lafollette, Tenn., chief engineer and manager of the coke department of the Lafollette Coal and Iron Co., has resigned his position, effective about Jan. 1. His successor has not yet been appointed.

U. S., Morris, who has been vice-president and general manager of the Superior Colliery Co., has been made president of that company, and also president of the Superior Development Co. The company's headquarters are in Detroit, and the operating properties largely in Jackson County, Ohio.

David J. Thomas has been transferred from the Hollenback No. 2 colliery of the Lehigh & Wilkes-Barre Coal Co. to the general foremanship of the Buttonwood No. 22 colliery. Reese Jones has been promoted from an assistant foremanship at the Stanton No. 7 colliery to succeed Mr. Thomas at the Hollenback No. 2.

Charles McKay, of Wylie, Penn., superintendent of the Patterson mine of the United Coal Corporation, has resigned his position effective Dec. 15, to accept a similar position at the Republic coal mine of the Republic Iron and Steel Co., at Republic, Penn. He will be succeeded by Joseph Kennedy, of Wendel, Penn., superintendent of the Adna No. 2 mine of the Pittsburgh & Baltimore Coal Co. Mr. Kennedy will be succeeded as superintendent at Adna No. 2 mine by Joseph Maize, mine foreman of the same mine.

Baron Rhondda, who has been appointed president of the local government board in the new British cabinet, is better known in the United States as David A. Thomas, head of the Cambrian Coal Combination. Before being elevated to his present position in the peerage he visited the United States and examined the coal fields. He was on the Lusitania when she was sunk in 1915. Later he was sent to this country to represent the munitions department of the British government in the United States and Canada and on his return to England was created a baron.

Industrial News

St. Louis, Mo.—The Bickett Coal and Coke Co. has moved from the Railway Exchange Bldg. to larger quarters in the Syndicate Trust Bldg.

Bluefield, W. Va.—The Pocahontas Coal Land Co. recently decided at a meeting of stockholders that it would discontinue business and surrender its charter to the state.

Charlestown, W. Va.—O. J. and E. M. Cox, coal operators of Charlestown, have established the Carter Coal Co., and will operate at Belle. One mine has been already opened. A commissary department will also be conducted.

Hazard, Ky.—S. D. Hughes, Winchester, Ky., and C. E. Bowman, of Hazard, contemplate the development of coal lands near Webb's Branch and are considering the organization of a company to be capitalized at $700,000.

Pittsburgh, Penn.—The Asbestos Protected Metal Co., of Pittsburgh, recently announced the appointment of Meyer Davis, formerly chief engineer, as manager at its San Francisco office, located in the Hobart Building.

Johnstown, Penn.—Local coal operators recently expressed the belief that the worst stages of the car famine have been passed, and that a steady improvement may be now expected. The present supply is a little better than 60 per cent.

Whitesburg, Ky.—To relieve the heavy coal traffic originating in the Fleming-McRoberts field the Louisville & Nashville Railroad Co. is making preparation to build additional yards at the mouth of Colly Creek. The work will start at once.

Hemphill, Ky. (P. O. Baker, Ky.)—The Elk Horn By-Product Coal Co. will award contracts within a few days for building 30 new miners' houses at Gorman. It will also open two new mines to be operated soon after the first of the new year.

Hazard, Ky.—The Stag Coal Corporation has been organized here with $1,000,000 capital to make developments of coal properties immediately above Hazard in the Carr's Fork and Lott's Creek sections. Deals have just been closed for the properties.

Norton, Va.—The Gladeville Coal Co. has been incorporated with a capital of $50,000, R. I. Cawthorne, trustee, and the mines at Stevens, Lipps and McLemore have been purchased and will be reëquipped. The output will be approximately 7,000 tons per month.

St. Louis, Mo.—Arrangements have been completed for the opening of a municipal coal yard at Granite City, across the river from St. Louis. Mayor Steele has arranged with several big corporations to let the city have coal at its contract price of $2.75 per ton.

Birmingham, Ala.—The Woodward Iron Co. will begin at once the construction of a new 60-coke-oven battery at Bessemer, Ala. With the completion of these this company will have 200 byproduct ovens, the daily output of which will be more than 3,000 tons of furnace coke.

Central City, Ky.—The Pacific Coal Mining Co. has been incorporated by C. D. Glass, of Louisville; J. H. Tate, of Mercer, and J. W. Lam, of Greenville, with a capital stock of $8,000. The

principal office of the company will be at Mercer where a mine will be developed.

Huntington, W. Va.—A new record in loading and handling coal was recently established by the Chesapeake & Ohio R.R. when 2,991 cars, or 156,930 tons were loaded and handled. This compares with 2,885, or 146,690 tons on Nov. 29, 1915, which was the largest day previously.

Seco, Ky.—The South East Coal Co. will at once install a saw mill at Seco for the purpose of cutting a large timber boundary for its future building requirements in the coal fields. This firm has just arranged for 40 more new buildings, the construction to be started at once.

Duquoin, Ill.—Work is being pushed on the grading for the new interurban line through the coal country between Murphysboro and Carbondale. The Heman Construction Co. and sub-contractors are preparing the roadbed between Carbondale and the Big Muddy River.

Seco, Ky.—The South East Coal Co. will build 10 additional miners houses in Seco, the work to begin at once. It will also build about 50 in La Viers the new operation 3 mi. below Seco. The company proposes to double its present output soon after the first of the new year.

Williamson, W. Va.—The Rhodell Coal Co. has been incorporated with chief works in the Slab Fork district of Raleigh County. The authorized capital is $25,000, and the incorporators are A. Z. Litz, of Tazewell, Va.; D. C. Berger, of Chattaroy, B. D. Dunman, of Mullens, and N. H. Mannakee, of Williamson.

Loyalhanna, Penn.—Within the next few weeks the Jamison Coal and Coke Co. will begin the development of the tract of coal land recently acquired. The Jamison interests have nearly 2,000 acres of Freeport coal and recently purchased the Saltsburg Coal Co.'s holdings of the Pittsburgh seam.

Pittsburgh, Penn.—The West Penn Electric Co., in all new industrial contracts for power, is introducing a clause providing for an increase in the price per kilowatt-hour of energy consumed in case of any increase in the price of coal above a certain amount. Existing contracts are also being modified where possible.

Bluefield, W. Va.—W. H. Soper, of Des Moines, Iowa, president of the Marion Smokeless Coal Co., was recently in this city on business. He is opening mines in the Tug River field, and expects to be shipping in the near future. It is quite likely that Mr. Soper will establish headquarters at Norfolk, Va.

Fleming, Ky.—J. W. Reedy and others, of Hazard, are starting the development of the Quiller Bentley coal tract at the mouth of Potters Fork on the main line of the Louisville & Nashville, 1 mi. below Fleming. They plan a daily capacity of 1,000 tons to begin with. The mining work is to start as early as possible.

Fairmont, Va.—The mines of the Hutchinson Coal Co. in the Clarksburg region are to be electrified, power being furnished by the Monongahela Valley Traction Co. This electrification signifies that all machinery will be operated electrically instead of by steam, also the installation of a complete lighting system.

Philadelphia, Penn.—The Standard Scale and Supply Co. recently announced that it has taken up its quarters in its new building at 523 Arch St., Philadelphia. A large stock of scales, concrete mixers, air compressors, gasoline and oil engines, etc., will be carried, so that prompt service can be rendered to customers.

Fairmont, W. Va.—What is now called the Stafford Coal Co., with a mine situated at Baxter, is to be renamed the Stafford Byproduct Co. since its purchase by the Traction Co. for the purpose of manufacturing gas and byproducts. Work on the byproduct plant has not yet started, but will probably begin in the near future.

Galesburg, Ill.—The City Council has authorized the appointment of a committee to meet with committees from other Illinois cities at Springfield and discuss legislation looking to municipal ownership of coal mines. Among the cities to be represented at the conference are Quincy, Danville, Decatur and Peoria. The date has not been fixed.

Harrisburg, Penn.—Governor Brumbaugh on Nov. 29 approved the merger of the Rockhill Coal and Iron Co., and the Broad Top Improvement Co., the combined company to have the Rockhill name and a capital of $1,200,000. The president is G. T. Roberts, of New York, while S. J. Livingston, Philadelphia, is secretary and treasurer.

St. Louis, Mo.—The rain on Dec. 7 was the first for several weeks in this section and in many cases mines in the southern Illinois field have had to haul water to keep working. The mine at New Baden was idle for several days on account of no boiler water, and the conditions have become serious in several mining sections. The rain and snow has helped things temporarily.

Clarksburg, W. Va.—The St. Leo Coal and Gas Co. has been organized at Clarksburg with chief works in the Battelle District of Monongalia County and elsewhere in the state. The authorized capital is $250,000 and the incorporators are H. G. Hart, of Mannington, F. L. Lockwood, and J. W. Maupin, of Washington, D. C., J. M. Maupin and George W. Ashcroft, of Clarksburg.

Philadelphia, Penn.—A new bituminous company under the name of the J. Jordan Coal Co. has been organized by H. P. Jordan, with offices in the Real Estate Trust Building. Mr. Jordan is a son of S. H. Jordan, a West Virginia coal operator. The latter has recently purchased a 760-acre coal tract at Gorman, W. Va. This property is soon to be developed to a capacity of 500 tons per day.

New Orleans, La.—The Corona Coal Co., of Birmingham, recently purchased the tugs, colliers and entire equipment of the Monongahela River Consolidated Coal and Coke Co., of Pittsburgh, and the Pittsburgh Coal Co. The price is said to have been $500,000. It is said that by this deal Pittsburgh coal will be eliminated from the New Orleans market, and the Alabama product substituted.

Kelso, Penn.—The operations of the Bird Coal Co. have been sold to an Eastern syndicate, it was learned recently. The plant includes two large mines and a big tract of coal land in this vicinity. One of the mines, a slope, was recently purchased by the Bird interests from the Keystone Coal and Coke Co. The plant will be enlarged in the spring. Modern equipment will be installed and the daily output increased.

Frankfort, Ky.—The last 400 acres of the 240,000 acres of Harlan County mountain land, once owned by the Cumberland Land and Lumber Co., have been disposed of in a finding of the Court of Appeals. This affirms the finding of the Harlan Circuit Court, which held the purchase by C. C. Smith of this land at a forfeiture sale for taxes void and held in favor of W. L. Bramblett, of Louisville, administrator of G. W. Bramblett, who purchased the property in Louisville at a sheriff's sale.

Hazard, Ky.—The Stag Coal Corporation, of Virginia, has purchased and taken over the holdings of R. D. Baker, Winchester, Ky.; Robert C. Reams, trustee; J. L. Kemerer and M. C. Cramer, of New York and others. The purchaser is a branch of the Kentucky River Coal Corporation, of Lexington, and is reported to have paid more than $100,000 for the land, which runs into thousands of acres and lies on Georges Branch and Stacys Branch of Carrs Fork, on Lotts Creek and Troublesome Creek.

Terre Haute, Ind.—Articles of incorporation have been filed in the office of the Vigo County recorder for the Zimmerman Coal Co., which incorporates for $100,000. The corporation is to mine and sell coal and under the provision of the articles the concern agrees to give to W. Paul Zimmerman, 495 shares of the common stock in lieu of the coal rights on 431 acres of land in Vigo County. The incorporators and directors for the company are W. Paul Zimmerman, John B. Mershon and Milton T. James.

Columbus, Ohio—It did not take the state utilities commission long recently to authorize the Toledo & Ohio Central R.R. to purchase additional coal cars. Because of the shortage of cars and its influence in raising the price of coal, the commission dropped all other business and granted immediate hearing when the application was filed. Ordinarily a hearing date would have been set for some time in the future. The Toledo & Ohio Central was authorized to issue $1,200,000 worth of trust certificates to purchase 1,000 steel hopper cars.

Wellston, Ohio—A meeting of a committee from mine No. 11 of the Superior Colliery Co., of Wellston, headed by Lee Hall, vice-president of the Ohio miners' organization, with J. M. Roan representing the coal company and the general manager of the Cincinnati, Hamilton & Dayton R.R., will be held soon in order to get the labor train from the mine to Wellston run on time. The miners have a complaint that the railroad often allows them to sit around for a half hour in their wet clothing before taking them to their homes.

Cincinnati, Ohio—In the case of the Marmet Coal Co. the superior court has been asked to determine questions of priority among bondholders and other creditors of the company. Bondholders have also been active in their effort to set aside the sale of $563,500 of the company's bonds to the Western German Bank and the Second National Bank under foreclosure of collateral. It is alleged that the conditions under which the banks bought in these bonds were not fair to the company's interests and to those of other bondholders.

St. Louis, Mo.—The property of the St. Louis & Coulterville Coal Co. is to be sold on the recommendation of Special Master in Chancery Wangelin, of Belleville, Ill., to liquidate $76,171.28 debts. Circuit Judge Crow will set a time for the filing of exceptions. The report of the special master shows that William Winkelman, of Belleville, an attorney, has a preferred claim of $8,050.42. The Belleville Bank and Trust Co. claims $34,872.34, Winkelman holds a second mortgage for $24,004.02, and the Gundlach estate has a claim of $9,224.04.

Winnipeg, Man.—A project is on foot for supplying the city with anthracite coal at considerably cheaper prices than those which have hitherto prevailed. R. J. Mackenzie and associates are the owners of extensive coal lands on the eastern slopes of the Rocky Mountains at the Yellowhead Pass. The property lies about 40 mi. from the Canadian Northern Ry. and it is planned to build a spur line to the mines. It is understood that favorable freight rates over the Canadian Northern have been promised and the organization of the enterprise is in progress.

Johnstown, Penn.—The Johnstown & Somerset R.R. (electric), running from Johnstown to Somerset, has been under construction for some months past, but the work recently has been slow on account of lack of capital. This has recently been secured, and the road will be pushed to an early completion. The length of the line will be about 35 mi., and it will pass through a coal country, part of which has heretofore been without passenger accommodations. The headquarters of the company are at Somerset. Power will be secured from the Penn Service Electric Co., of Johnstown, Penn.

Bluefield, W. Va.—The Norfolk & Western for several weeks has been confronting a serious problem relative to its coal supply. Notwithstanding the fact that the company has voluntarily increased the contract price for its coal 15c. per ton and has offered other concessions, a great percentage of its coal, it is said, had to be confiscated and paid for at current rates. At a meeting of operators and railroad officials recently held in Roanoke, it is understood that a five-year contract proposition was placed before the coal men which would be fair to the railroad and also to the operators as an average for that period.

Pittsburgh, Penn.—Contracts involving nearly $3,000,000 have been let to the H. Koppers Co. here by the Dominion Iron and Steel Co., of Canada., for construction of a large number of by-product coke ovens at Sydney, Nova Scotia, it was announced by officials of the company on Dec. 8. The Dominion Iron and Steel Co. needs such a plant and the ovens will be built on the most improved plans, so that byproducts from the coke can be extracted to full advantage. The Koppers company is one of the largest concerns of its kind in the world and a large force of men are at work on the plans. It is not yet known where the materials entering into the construction of the ovens will be bought.

Benton, Ill.—It is announced that work is to begin at once on the railroad, which is to connect the coal towns of Eldorado, Harrisburg, Marion, Herrin, Johnston City, West Frankfort and Benton. It is understood that when the road is completed the Illinois Central will use it extensively for coal hauling, which will give the road a track to practically every mine in Franklin, Williamson and Saline Counties. It is expected that the system will later be extended from Benton to Buckner, Christopher, Ziegler and Royalton. The Shott interests, building the system, were recently reported to be negotiating for the Black Diamond road, connecting Marion and Pittsburg, but this deal is now said to be off.

New York, N. Y.—The annual meeting of the Coal Merchants' Association, Inc., of New York, was held on Dec. 10, at 90 West St., New York City. The following officers were reëlected: Warren A. Leonard, president; Theodore S. Trimmer, vice-president, and Arthur F. Rice, secretary, treasurer and commissioner. Commissioner Rice in his report called attention to the fact that the present season has surely been full of turmoil and uncertainties and has brought to the surface some new problems and unusual conditions.

Up to Dec. 1 there were turned into the Association 1325 accounts, aggregating $120,528.21, of which 840 were collected, or 61.45 per cent., and there was returned to the members $73,170.38.

Pottsville, Penn.—Nearly all the important anthracite companies will increase their storage capacity in the Schuylkill region in order to baffle speculators who periodically raise the price of coal above circular rates. The Philadelphia & Reading Coal and Iron Co. will add four enormous bins to its Landingville yards. These storage yards figured importantly in checking the recent attempt to compel the people of New York and Philadelphia to pay extortionate prices for coal. When the situation became apparent, President W. J. Richards, of the Philadelphia & Reading Coal and Iron Co., ordered a force of men to be employed night and day, and long trains of cars were shipped from there daily in addition to the regular shipments from the mines.

Pittsburgh, Penn.—Interests representing the United Coal Corporation of Pittsburgh have obtained control of about 55 per cent. of the outstanding bonds of the Merchants Coal Co. A reorganization of this latter firm will probably be made soon. The Merchants Coal Co. has large holdings in Somerset County, Penn., and operates the Orenda Slope at Boswell and a small mine at Elk Lick, as well as a mine at Tunnelton, W. Va. It also has two slope mines not now in operation, and not equipped located near Boswell. This company has been in the hands of receivers for over three years. The Baltimore & Ohio R.R. has announced its intention of constructing a 6-mi. branch line to develop some timber lands which are close to the two slopes mentioned, making their early operation possible. It is probable that at least one of the slopes will be equipped for operation between now and spring. Rights-of-way for the railroad extension are now being secured, and the construction will be pushed as rapidly as possible, it being expected that this will be completed by Apr. 1 next.

Market Department

GENERAL REVIEW

Anthracite trade well prepared for the cold weather. Average bituminous quotations fall off sharply and Pittsburgh district prices also decline further though still at abnormal levels. Domestic grades weak in the Middle West but steam coals steady.

Anthracite—The recent cold snap has not been of sufficient duration to judge the possible effect on the market, which has recently developed a distinct weakness as a result of the protracted unseasonable temperatures. Consumers' bins have been well stocked during this interval, and it will probably take a period of very severe weather to cause a recurrence of the extreme activity that marked the early fall trade. Wholesale business, however, continues very steady. Dealers' stocks have been moving out as rapidly as received, and they are making strenuous efforts to accumulate some reserve supplies. In addition to this, production continues very light, and will be still further reduced shortly by the customary slowing up over the holiday period. At outlying points, such as New England, the arrivals have not increased, and the anxiety over the scarcity is as pronounced as ever. The flood of inquiries for steam coal, occasioned by the shortage of bituminous grades, continues unabated, thought there is little free tonnage available for this business.

Bituminous—Average prices show the greatest decline of the present movement amounting to 21c. per ton as compared with 2c. the previous week, and 9c. the week before, which was the beginning of the decline; prices, however, continue at very abnormal levels, being close to $3 per ton above the average for this week last year, which was considered as a profitable figure. Labor difficulties are beginning to displace the car shortage in importance. A good many smaller operations with no contract obligations are obtaining the ruling high prices on practically all of their tonnage, and are in a position to make special inducements to miners which the larger companies operating on moderate profits cannot possibly hope to meet. As a result some of the very best companies are facing a serious predicament. With the holiday slowing down in operations, the consuming interests are especially anxious to accumulate some slight reserves against a possible delayed movement. There is considerable discussion, though no definite move as yet, on the matter of new contracts.

Lake Trade—There was a further recession of 25c. in Pittsburgh district prices, making the total decline from the high level of several weeks ago, about 75c. per ton, though in spite of this spot prices still range in the neighborhood of three times the average figure. The reaction is due in part to a slightly better car supply, though the increase resulting from the cessation of Lake shipments was much below expectations. The abnormally mild weather was also a potent influence in the decline as it tended to both restrict consumption and accelerate the movement. With more coal available there has been a moderate spurt in the final Lake shipments though boats are scarce, the inclement weather having occasioned delays. The market shows no general weakness, consumption continuing unabated with supplies no more plentiful though the very urgent demand that marked the crest of the recent rise has been satisfied for the time being at least. Negotiations on new contracts point to substantially higher figures in the future.

Middle West—Vigorous efforts of the sellers to break the market, which was much helped by the exceptionally mild weather, has developed many uncertainties and cross currents. On the one hand steam-coal prices have held generally firm, while on the other domestic quotations have reacted very sharply, the situation almost bordering on demoralization at some points. The car supply has also improved materially, which has helped shippers to catch up on their contract obligations. The withdrawal of orders for considerable tonnage of the domestic grades, in accordance with the general plans for forcing prices down, has met with no little success. The continued heavy steam consumption, which shows no indication of easing off, supplemented by a persistent demand from outside sources, are still the main constructive features of the market. Stocking operations on the part of the railroads in anticipation of trouble over the Adamson Law is also a factor.

A Year Ago.—Severe weather precipitates a rush for anthracite. Speculative element in control of the bituminous market, and spot tonnages commanding high prices. Coal famine in parts of Europe. Middle Western steam coals make substantial gain and there is considerable stocking.

Comparative Average Coal Prices

The following table gives the range of mine prices in car lots per gross ton (except where otherwise noted) on 12 representative bituminous coals over the past several weeks and the average price of the whole group for each week:

Boston	Last Year	Dec. 16	Dec. 9	Dec. 2	Nov. 25	Nov. 18
Clearfields	$2.40@2.75	$4.75@5.75	$4.75@5.75	$4.75@5.75	$4.75@6.00	$3.65@3.45
Cambrias and Somersets	2.50@3.00	5.25@6.25	5.25@6.25	5.25@6.25	5.25@6.50	4.00@5.25
Pocah. and New River[1]	6.00@6.25	7.00@7.50	7.00@7.50	7.00@7.50	7.00@7.50	7.00@7.50
Philadelphia						
Georges Creek	2.20@2.30	6.00@6.25	6.00@6.25	6.00@6.50	6.50@7.00	7.00@7.25
W. Va. Freeport	1.90@2.00	5.00@5.25	5.00@5.25	5.00@5.25	5.00@5.50	6.25@6.50
Fairmont Gas mine-run	1.40@1.50	5.25@5.50	5.25@5.50	5.25@5.50	4.75@5.00	6.45@6.55
Pittsburgh (steam coal)[2]						
Mine-run	1.15@1.20	4.00@4.25	4.25@4.50	4.25@4.50	4.75@5.00	4.75@5.25
¾-in.	1.25@1.35	4.00@4.25	4.25@4.50	4.25@4.50	4.75@5.00	4.75@5.25
Slack	1.00@1.05	3.50@3.75	4.00@4.50	4.25@4.50	4.50@4.75	3.75@4.25
Chicago (Williamson and Franklin Co.)[2]						
Lump	1.60@1.75	3.00@3.50	3.50@4.00	3.50@4.00	3.50@4.50	3.50@4.00
Mine-run	1.10@1.15	3.00@3.25	3.50@4.00	3.50@4.00	3.50@4.00	3.25@3.75
Screenings	75@0.85	3.00@3.25	3.50@3.75	3.50@3.75	3.25@3.75	3.00@3.50
Gross average	$1.94@2.09	$4.48@4.90	$4.69@5.15	$4.71@5.17	$4.80@5.33	$4.78@5.21

[1] F.o.b. Norfolk and Newport News. [2] Per net ton.

BUSINESS OPINIONS

Iron Age—All calculations of domestic buyers and sellers of steel have long been based, not on the imminence of peace, but on the indefinite continuance of the war and the present price structure has been built up by the war. For months contracts between American steel manufacturers and the Allies have been drawn so as to guard against an abrupt falling off in the demand for war purposes. A stipulation in some contracts is that if shell steel is not specified the buyer shall take soft steel in some form, as rails, plates, or shapes. Concerning the Steel Corporation's increase of over 1,000,000 tons in orders in November, it is stated on authority that out of nearly 2,500,000 tons booked in that month less than 10 per cent. is to be classed as export war business.

American Wool and Cotton Reporter—Speculation in scoured wools, particularly capes, is one of the features of the wool market. It is predicted that little wool will be on hand on Jan. 1. Some houses are all sold out, and others have only a small supply of stock. Reports that Germany and her allies want peace seem to have no effect on the wool market. High prices continue to be paid in the West for wool on the sheep's back on a basis of $1 a pound, landed. Sales totaled some 6,000,000 lb. Considerable buying with an upward tendency in the cotton market recently followed the report that Germany and her allies wanted peace. It will probably require more than the present report to have any great effect on the cotton market.

Dun—Continuing remarkably active and profitable, business has gained in wholesome characteristics through the lessening of excitement in some of its leading branches. The situation is now more settled in iron and in dry goods, as in certain other lines where feverish conditions have existed, while decidedly higher money rates and calls for increased margins have had a restraining influence on speculation in stocks and commodities. Commercial failures this week in the United States are 333, against 247 last week, 313 the preceding week, and 372 the corresponding week last year.

Bradstreet—Consumption continues to overtax production, and in some respects even greater velocity than heretofore is evidenced, numerous lines having all and more than they can handle. Yet there are a few halting signs, such, for instance, as less feverishness in pig iron, possibly due to the fact that prices are up all around, diminished buying of some food products that have been subjected to boycotts, complaints of warm weather retarding retail trade in seasonable merchandise, with intimations from the interior districts of the spring-wheat northwest that perhaps country dealers are temporarily overstocked. Incidentally, nation-wide investigations regarding the high cost of necessaries are under way or projected, while rates for money are higher.

Dry Goods Economist—Although but two weeks remain for the holiday business, inquiry among the New York stores shows that this important trade has not developed to the extent that had been expected. In other words, while there has been an active business in general, the gift-buying crowds have not yet put in an appearance. The demand at wholesale in most lines of dry goods has shown a slackening off.

Atlantic Seaboard

BOSTON

Pocahontas and New River still scarce, but contract shipments fair. Spot prices continue firm. Pennsylvania grades fluctuate from day to day. Pittsburgh coals quoted. Mild weather helps anthracite situation.

Bituminous—The Hampton Roads agencies are persisting in their policy of confining shipments to contract, and very few spot sales are heard. Occasionally a ship needs a few hundred tons to clear, and that is about the extent of the spot market f.o.b. At another time the situation at Hampton Roads might be regarded a bit easier, but the holidays are just ahead. Car-supply on two of the Virginia railroads is ragged and operators continue to be held down to an unusually small output most of the time. Inadequate motive power is also a contributing factor in delays at the piers. All the dumping of a week could be done in two days at some of the piers, it is said, coal is running in so slowly.

Kanawha and other high volatiles are being sent to Tidewater, in larger volume than usual. High prices are doubtless the attraction, and quantities of these grades are likely to assist materially in loading boats for New England. To that extent dispatch may improve the next week or so and make the f.o.b. situation that much easier for the moment. It will help forestall the week of slender receipts that is bound to follow the Christmas celebration.

At this end receipts are just about equal to consumption, with most of the consumers. Slight reserves, accumulated earlier in the season, are relied upon to offset delays loading or in transit. A few purchases continue to be made in the open market to piece out supply, and those rehandling plants that are equipped with lighters are being used to capacity in order to keep going plants that are directly on Tidewater and awaiting cargo arrivals.

While there are no definite moves toward contract business, there is some discussion already over the possible range of prices at Hampton Roads in 1917. A few consumers are trying to canvass opinion, with the idea probably of being early on the ground. It is generally recognized, however, that the situation will be up to those shippers who have transportation of their own, for there is bound to be a shortage of coastwise tonnage, even without allowing for a normal increase in consumption.

The Georges Creek shippers are struggling along in a desperate effort in some way to supply the trade dependent upon them. With the consent of consignees, high volatile and other coals have been substituted.

The Pennsylvania steam-coal operators are all suffering from the eccentricities of the car situation. A mine may have its entire daily output sold on contract, but when cars are set in that cannot be sent to such points the coal must be loaded for destinations where no coal is due and usually where the operator does not want it to go. Labor shortage is also pressing, and an operator can consider himself fortunate if his output exceeds 40 per cent.

The embargo against the Boston & Maine of coal emanating on the N. Y. C. was lifted and

the same day shipments via Boston & Albany to B. & M. points were put under ban. Spot coal is to be had at this writing at prices all the way from $5 to $6, a fair proportion of it in transit. There are predictions of $7 again by Jan. 1.

Bituminous at wholesale is quoted about as follows, f.o.b. loading ports at points designated, per gross ton:

	Clearfields	Camb. & Som's't	Geo'gs. Creek*
Philad'la	$6.00@7.25	$6.25@7.50	.....
New York	6.25@7.40	6.50@7.75	.....
Baltimore	.....	.....	.....
F.o.b. mines	4.75@5.75	5.25@6.25	.....

*On contract

Pocahontas and New River are quoted at $7@$7.50 f.o.b. Norfolk and Newport News, Va., for spot coal, and $9.50@10 on cars, Boston & Providence, for inland delivery.

Anthracite—The situation here on domestic sizes continues acute. The dealers are sending out only hand-to-mouth deliveries and are barely able to keep consumers supplied. Each distributor makes it a point only to look after regular trade. The great anxiety is on account of the colder weather which must come. Not in recent years have we had rivers like the Kennebec and Penobscot continuously open so far into December

The loading situation is as discouraging as ever. Boats are still waiting, not for particular sizes but for any size or sizes available, and demurrage continues to accrue. At Philadelphia additional barges are being placed for bituminous because anthracite is coming down so slowly.

On account of the mild weather, independent coal is easier in price. Dealers are learning not to be against each other—in mild weather.

NEW YORK

Anthracite market quiet. Tidewater supplies scarce but there is less urgency on the part of buyers. Steam sizes are firmer. Bituminous in good demand but prices practically unchanged. Spot coals scarce and car shortage unimproved.

Anthracite—Conditions continue easy in the anthracite market. Supplies at Tidewater are scarce but are sufficient to meet the demand which is slower. In the opinion of some the trade has experienced the quiest week in a couple of months. There was considerable interest in the tonnage figures for November which show a decrease of over a half million tons as compared with November of last year.

There were several changes in quotations for individual coals during the week but the market as a whole remains practically the same. The demand from New England continues heavy but it is hard to get shipments through. Dealers on Long Island report plenty of coal on hand and are not in the market for further supplies at this time.

With conditions as at present it is likely that some wholesale dealers will not think it necessary to send salesmen into the field until next spring. Production is not increasing sufficiently to create a surplus and with the winter ahead there is little probability that shippers will have to force sales.

Reports from inland sections show conditions easier than at Tidewater. Buying is slow and mine prices are lower, quotations ranging from $5 to $5.50 for egg, stove and chestnut.

Broken is scarce and practically out of the market, so far as Tidewater is concerned. Egg and stove are in about the same condition as last week; supplies of either size are scarce and individual lots are quoted at from $7.25 to $7.50.

Chestnut is easier; some individual lots were moved during the week at $6.50 but later there was a strengthening of prices.

Pea coal is scarce and is being held at from $5.50 to $5.75 at Tidewater and about $3.50 at the mines.

Of the smaller anthracite coals buckwheat No. 1 was the tightest. Rice and barley were freer.

Current quotations, per gross ton, f.o.b. Tidewater, at the lower ports are as follows:

	Circular	Individual
Broken	$4.95	
Egg	5.45	$7.25@7.50
Stove	5.70	7.25@7.50
Nut	5.75	7.00@7.50
Pea	4.00	5.50@5.75
Buck	2.75	4.00@4.25
Rice	2.20	2.75@3.25
Barley	1.95	2.20@2.60
Boiler	2.20	.....

Quotations at the upper ports are generally 5c. higher on account of the difference in water freight rates.

Bituminous—Demand is good but there is a sufficient amount of coal coming to Tidewater to take care of present wants. A few days of real cold weather would cause a shortage here. Shippers are able to take care of their contract requirements but there is comparatively little free coal available. The market is quiet now in comparison with what it was a few weeks ago but shippers complain of slow deliveries on account of lack of cars which is becoming worse. For four days last week the supply on some roads averaged between 10 and 15 per cent. and the outlook for this week was no better.

There are many inquiries regarding contract prices for next year and while not many are reported as closed the prices quoted range from about $2.50 to $3 at the mines which indicates that it will be hard to get cheaper coal during the next twelve months. Occasionally $3.50 is heard as having been quoted for a high-grade coal.

Some of the better grades of bituminous are practically out of the market. Good grades of steam coals are held at from $6.25 to $6.50 at Tidewater and from $5 to $5.25 at the mines.

Current quotations, per gross ton, f.o.b. Tidewater, for various grades are as follows:

	South Amboy	Port Reading	Mine Price
Georg's Crk.			
Big Vein	$7.00@7.25	$7.00@7.25	$6.00@6.25
Tyson	6.50@6.75	6.50@6.75	5.50@5.75
Clearfield	6.25@6.75	6.25@6.75	5.25@5.50
South Frk	6.50@6.75	6.50@6.75	5.25@5.50
Nanty Glo	6.50@6.75	6.50@6.75	5.25@5.50
Som'r. Co.	6.50@6.75	6.50@6.75	5.25@5.50
Que'ho'ing	6.50@6.75	6.50@6.75	5.25@5.50
W. V. Fa'rm't			
Th'r'qua	6.50@6.75	6.50@6.75	4.75@4.90
Mine-run	6.50@6.75	6.50@6.75	4.75@4.90
West. Md.	6.25@6.50	6.25@6.50	5.00@5.25

PHILADELPHIA

Anthracite retail trade falls off but dealers striving to increase depleted stocks. Shipments arriving in fair volume. No decline in the wholesale demand. Bituminous very active. Prices moderately firm, but show wide fluctuations at times.

Anthracite—Little new business has been recorded by the retailers this week, despite the more seasonable weather conditions. Most of them seem to have caught up with their deliveries and had they less anxiety about their supply would actually be complaining of dull times. However, the shippers' books continue jammed with orders. For the first half of the present month the shipments have been light, and had the business on domestic sizes been brisk there would have been a repetition of the early days of last month. Buyers are uneasy at the prospect of severe weather and the probable light production during the holidays.

Every effort is being made by the retailers to stock their yards to the utmost and they will not admit that business has fallen off for fear it will weaken their request for augmented shipments. It is a fact, nevertheless, that a large number of the yards are at a standstill and teams are known to have been laid off. However, no dealer is taking a chance of laying off men, which the situation actually would warrant, as they expect to need all they can get very shortly.

Dealers located on the lines of the P. & R. Ry. have received better shipments than their competitors on the Pennsylvania R.R. This is particularly true of pea coal; few P. & R. dealers are short of this size and many are carrying nearly full stocks. This is because of the continued heavy shipments from the storage yards along the line of the P. & R. Ry. This source of supply has been further reduced and is now reported as about 300,000 tons of all sizes as compared with 600,000 tons four or five weeks ago and considerably over 1,000,000 tons a year ago.

Dealers along the Pennsylvania were cheered this week by one of the large companies notifying them they could expect substantial consignments the next few days. Word came that the officials were convinced of the seriousness of the situation and had decided to divert their coal in this direction.

One large shipper of high-grade coal recently notified the trade of an advance of 10c. a ton on all sizes. If this was done to scare off buyers it failed of its purpose for it is known that their business shows no decline and the demand for this coal is as urgent as before. New customers thinking it was a bid for their trade made haste to place orders, only to be informed that the new price was really an increase to their regular trade, which is more than absorbing the production.

The relative demand for the sizes remains the same as the two previous weeks. Broken maintains the position it has held for months; there is actually none for sale and no prospect of increasing the production.

The local demand for egg remains light but it is in very short supply. Outside markets still demand it and business is not sought. Dealers complain because that it takes from ten days to two weeks to secure the small quantity required.

Stove occupies its regular position as the leading size. So many dealers report having lost sales for the want of it that suspicion is being aroused that they are exaggerating their requirements.

Chestnut is active, with the prospect of a scarcity as soon as the storage piles of the big companies are exhausted. The production would not supply the market should the abnormal demand of a few weeks ago be renewed, but just now it is fairly easy. Pea is the weakest of the domestic sizes, and is likely to continue so for some time. Many dealers have as much pea coal on hand as egg, stove and nut combined. A few shippers are known to be short of it, with their trade suffering, but the condition is far from general.

Steam sizes are as active as ever, with the shipping offices of the big companies flooded with inquiries from industries that have never used anything but bituminous. However, very little new trade is being accepted, as with no coal in storage the production is just about taking care of the normal demand. On what few cars of buckwheat that have been sold to new customers the price has ranged from $3 to $3.75 per ton.

The general public have lost their panicky state of mind, and the greatest concern now seems to be on the part of the dealers to be prepared for an emergency. It would appear now that no matter what the weather conditions may be the retail trade will probably have one dull month, because the people have their cellars full of coal now and it will be some time before further supplies will be required. While this market ordinarily never pays prices in excess of the circular, this anxiety on the part of the dealers still causes quite a number to occasionally offer premiums to the smaller shippers and brokerage houses.

Prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide shipments are as follows:

	Mines	Tide		Mines	Tide
Broken	$3.60	$4.75	Buck	$2.00	$2.90
Egg	4.15	5.25	Rice	1.25	2.15
Stove	4.10	5.60	Boiler	1.10	2.00
Nut	4.50	5.55	Barley	1.00	1.90
Pea	2.80	3.70			

Bituminous—The activity continues with a heavy demand for all grades of coal. The question of deliveries on contracts becomes more serious. Some of the largest and most reputable concerns report that the defection of men at their mines is becoming so acute that unless a change comes soon it will become necessary to close down some of their operations. This is due to many smaller concerns who have no contract obligations and are offering very attractive wage inducements to the miners of the other companies. Fear is expressed that this competition for labor may become so sharp that the prices of coal will advance to even greater heights than was recorded at the top of the boom.

Fairly good shipments have arrived here this week as compared with the average for the past month, but this is in no way looked upon as a general sign of improvement. All interests agree that their labor forces are now at the maximum they may expect and amounts to only 60 to 80% of their requirements. The car supply during the week has been good, but only because it has nearly met the capacity of curtailed working forces.

The price changes have not been of very great moment generally, although the market is fluctuating as much as $1 a ton on the same grade of coal from day to day. If anything there has been a slight recession in the prices of the Fairmont grades, but most sales to the consumer will probably average close to $5 a ton. Quotations which fairly represent current prices are as follows:

Georges Creek Big Vein	$6.00@6.25
South Fork Miller Vein	6.00@6.25
Clearfield (ordinary)	5.25@5.50
Somerset (ordinary)	5.25@5.50
West Va. Freeport	5.00@5.25
Fairmont gas, lump	5.50@5.75
Fairmont gas, mine-run	5.25@5.50
Fairmont gas, slack	4.50@4.75
Fairmont lump, ordinary	4.75@5.00
Fairmont mine-run	4.50@4.75
Fairmont slack	4.50@4.75

BALTIMORE

Bituminous firm, with supplies light. Anthracite improved by much colder weather. Exports poor.

Bituminous—The firmness in the bituminous trade is well maintained. There is no evidence of weakening in the high prices demanded for spot coal, and contract quotations, are apparently stiffening. As high as $3 to $3.50 for contracts over the year is the talk of the trade. Whether many will come in at such prices is of course uncertain, but the trade is apparently unwilling to make long-term contracts except at big figures. Car supply for this territory has varied from 30 to 90 per cent., but has more often been below 50 per cent. the past week than above it. Supplies at tide are light, and there is little surplus coal to offer. Prices to the trade at the mines are about as follows: Georges Creek, Tyson, $6.25; Somerset, $5.50; South Fork, $5 to $5.50; Clearfield, $5 to $5.50; Quemahoning, $5.50; Latrobe, $5; Freeport, $4.50; Fairmont gas, $4.75; mine-run, $4.50; slack, $4.50.

Anthracite—Wintry temperatures and the first sleet storm of the winter has stimulated interest in the anthracite trade. Many late orders were received by retailers here. As most of the dealers have generally caught up on back business, they were able to devote attention to the new orders. Deliveries from the mines are fairly good.

Exports—The foreign movement from this port is quiet. Few exporters are pushing that end of the business when they can readily sell any coals they can spare. The past week saw but a loading of 8,560 tons.

HAMPTON ROADS

Car supply still light. Slight improvement in stocks. Prices easier.

While there seems to be no improvement in the car supply, demand has not been so insistent for the past week; stocks have accordingly increased to a certain extent, though they have by no means reached normal proportions. Prices are slightly easier being quoted as follows for Pocahontas and New River run-of-mine: For shipment coastwise and foreign, $7.50@8; for bunker delivery, $7.50@8; for local consumption, $8 per net ton. Coastwise and foreign and bunker prices are for gross tons. Anthracite, $9 per net ton delivered.

The 11,000-ton motor ship "George Washington" is in port to load a cargo of coal for San Francisco for the Navy Department. This is one of the largest motor vessels afloat and is exciting a good deal of interest among shipping people. A large number of battleships and other naval vessels are here for the session of the Southern Commercial Congress and are taking large supplies of coal.

Railroad Tonnages—The following is a comparative statement of the tonnages handled by the different roads for the past several weeks:

	Nov. 18	Nov. 27	Dec. 2	Dec. 8
Nor. & West....	103,100	114,406	98,120	155,086
Ches. & Ohio...	96,449	93,038	101,279	13,999
Virginian.....	77,266	83,892	.....	54,447
Total.....	276,815	291,336	.....	173,532

PANAMA CANAL

Fuel movement through the canal for the week ended Nov. 17 was as follows:

Vessel	From	To	Tons
Tiberia	Newport News	Mejillones	6,946
Hawkhead	Norfolk	Mejillones	6,838

The acting governor has issued the following notice, under date of Nov. 11, 1916, addressed to all concerned:

1. Considerable misunderstanding exists on the part of coaling interests as to the application of circulars fixing the maximum selling price of coal sold by individuals and companies at the Panama Canal.

2. There is no intention on the part of the Panama Canal to interfere with any company carrying out its contracts or with the regular conduct of its business. These regulations were designed solely to protect shipping from discrimination or exorbitant charges for bunker coal at such times as there is a shortage of bunker coal on the Isthmus and the Panama Canal is unable to supply vessels using the canal. Only under such circumstances will the provisions of the circulars referred to be enforced.

Ocean Shipping

OCEAN FREIGHTS

Although a few steamers were chartered for export coal during the past week, none of these fixtures have been reported. Tonnage is still scarce, freight rates more than firm and the indications are that the market will soon reach a still higher level. We would quote freight rates on coal by steamer as follows:

	Dec. 4	Dec. 11
West Coast Italy....	$31.20@33.60	$32.40@33.60
Marseilles.....	30.00@32.40	31.20@32.40
Barcelona*[2].....	26.40@28.80	26.40@28.80
Montevideo	15.60 about	16.80 about
Buenos Aires	15.60 about	16.80 about
Rosario.....	16.80@18.00	18.00 about
Rio Janeiro.....	15.00 about	[3]16.00 about
Santos.....	15.50 about	16.50 about
Chile (good port)....	8.00@8.50	9.00 about
Havana.....	4.00 about	4.00 about
Cardenas, Sagua....	5.00@6.00	5.00@5.50
Cienfuegos	6.00@6.50	6.00@6.50
Port au Spain.....	8.00@9.00	8.50 about
St. Lucia.....	8.00@9.00	8.50 about
St. Thomas.....	7.25@7.50	7.50@8.00
Barbados.....	8.00@9.00	8.50 about
Kingston.....	6.00@6.50	6.00@6.50
Curacao[1].....	7.50 about	7.50 about
Santiago.....	6.00@7.00	6.00@7.00
Guantanamo.....	6.00@7.00	6.00@7.00
Bermuda.....	5.00@6.00	5.00@6.00
Vera Cruz.....	7.00@8.00	7.00@8.00
Tampico.....	7.00@8.00	7.00@8.00

* Spanish dues for account of cargo. [1] And p.c.
[2] Or other good Spanish port. [3] Net.
W. W. Battie & Co.'s Coal Trade Freight Report.
Note—Charters for Italy, France and Spain read: "Lay days to commence on steamer's arrival at or off port of discharge."

COASTWISE FREIGHTS

Rates on large vessels, Hampton Roads to Boston, continue nominally at $2, but no charters are reported. No shipper is taking vessels at current rates if he can possibly avoid it, unless it is for a speculative cargo which now is rarely the case from Hampton Roads. Owners of outside barges prefer the short run from New York to points on Long Island Sound to either Norfolk or Philadelphia, but inquiry from New York now is restricted because of the long waits for anthracite. It would not therefore be at all surprising to see concessions offered freely in the course of the next 10 days, although $1.25@1.35 is now the range quoted, with demurrage at 6@7c. per ton per day.

Lake Markets

PITTSBURGH

Spot coal slightly easier but decline less than was expected to follow discontinuance of Lake shipments. Real winter weather still to come.

Minimum prices for spot coal, both steam and gas, are down about 25c. since last report. The total decline from the high point of a few weeks ago is in the neighborhood of 75c., but the spot market is still about three times the average price obtaining on contracts, including the long-term contracts which are made at particularly close figures.

The slight easing off in the market is attributed to slightly better car supplies, but the improvement in this respect is very slight and nothing like as great as the improvement that was expected to occur by reason of the cessation of shipments in the Lake trade. Scarcely any coal has been shipped to Lake Erie in the past two or three weeks and if it requires longer than that for empties to return to the coal mines they are not going to do a great deal of good when they get there.

The weather up to date has been exceptionally favorable for the season and it is obvious that conditions would be much worse if there had been normal weather. It is still expected that the first real blast of winter weather will greatly slow down railroad operations and presumably put spot coal to much higher levels. The Pennsylvania system has a sort of double embargo, the lines east of Pittsburgh against the lines west and vice versa, but coal and coke are excepted from the order.

We quote spot coal, mine-run, at $4@4.25 for steam and $4.50@5 for gas, with slack at $3.50@3.75, per net ton at mine, Pittsburgh district. Contract coal is unquotable but indications are that contracts for the calendar year 1917 are going to be at considerably above $2.

BUFFALO

Bituminous continues easy. Slack stronger than sizes. Car situation growing worse. Embargoes becoming general. Soft weather easing up on anthracite demand.

Bituminous—The demand continues about as usual, but the situation is easier. It is often the case that shippers are unable to find customers for any coal they may have unsold on track so that there is nearly contract coal enough to satisfy the consumer. Advices from producing centers try to be firm, but the prices still sag. The closing of the Lakes always affects the trade unfavorably and it will do so now. Some shippers report a mine price in the Pittsburgh district as low as $3.50, but that is pretty low.

The railroad embargoes are becoming worse daily and if this continues it will be impossible to move anything soon. Roads embargo against one another and now it is said that the other roads are about to follow the New York Central in refusing to change the destination of a car and accepting nothing billed to the shipper, unless it is for bona fide delivery. This practically cuts out the jobbing trade, as it formerly existed.

With only slack doing really well the Buffalo prices, per net ton, f.o.b., run about as follows:

Youghiogheny Gas.....	$5.50@6.00
Pittsburgh Steam.....	5.25@5.75
Ohio No. 8.....	5.25@5.75
Cambria Co. Smithing.....	5.00@5.50
Allegheny Valley.....	5.00@5.50
Pennsylvania Smokeless.....	5.15@5.65
All Slack.....	5.00@5.50

Slack is selling about on a par with sizes, which brings everything on a nearly uniform level. Prices are very unsteady and vary often sharply from day to day.

This port received during the season 44,330 tons of coal by Lake from Sandusky, all West Virginia bituminous, for the Lackawanna Steel plant.

Anthracite—The demand still exceeds the supply but the mild weather reduced consumption materially, so that shippers believe that they are gaining on the shortage. They do not, however, expect to met all demands for some time yet. At the same time they are distributing in small quantities to all consumers and seeing that nobody is allowed to run entirely out.

The falling off of the premium for independent anthracite also shows that the consumer is not so insistent as he was. A month ago the premium was about $4 a ton, but $2 or $3 is the maximum now. Should the weather turn severe it is expected that the clamor will be resumed in full, though that would not necessarily indicate the extent of the shortage.

The Lake trade is practically at an end, though one shipper is still crowding coal to the docks for a final spurt. The amount of Buffalo coal loaded at Erie, while the D., L. & W. trestle was rebuilding here, may make up the million-ton shortage, as compared with last season, which the custom house reports here.

Lake shipments for the week exceed any former seven days in December being 101,000 tons, of which 39,000 tons cleared for Duluth and Superior, 32,500 tons for Milwaukee, 21,000 tons for Chicago, 7,200 tons for Fort William and 1,300 tons for Racine.

TORONTO, CAN.

Coal shortage continues serious. Yards empty and consumers dependent on deliveries from cars. Government action strongly favored.

The coal shortage is still a serious problem, but the weather has been very mild for the season; otherwise much suffering would have ben experienced as the yards are empty and dealers are dependent on the railroads for daily delvieries. Consumers are being supplied from hand to mouth with small quantities and so far manufacturers have generally been able to obtain enough to keep their plants in operation. There is a strong feeling in favor of prompt action by the government.

Quotations for best grades per short ton are as follows: Retail anthracite, egg, stove and nut, $9; grate, $8.75; pea, $8; bituminous steam, $11; slack, $9; domestic lump, $10; cannel, $10; wholesale f.o.b. cars at destination, bituminous three-quarter lump, $8.50; slack, $7.25.

DETROIT

Steam coal in less urgent demand. Cold weather brings more pressing inquiry for domestic stock. Lake trade is near end.

Bituminous—Wholesalers report a somewhat easier situation in the steam coal trade. The supply is apparently no greater and coal is not arriving in larger quantities, but the buyers show less inclination to bid against each other. The change perhaps may be credited in part to consumers having obtained enough coal to relieve them of immediate fear of a shortage. The restoration of complete embargoes on the Louisville & Nashville and other Southern roads during the week is expected to cause a further tightening of the local market. Mine quotations on nut, pea and slack, mine-run and three-quarter lump were about $4 most of the week.

With a sudden drop in temperature last Saturday, domestic consumers became more urgent for coal. Many of the retail yards have little domestic coal and it is feared a serious situation may develop if the low temperatures continue. Smokeless lump and egg carries a mine quotation of $5.75. Hocking and West Virginia or Kentucky lump are quoted at $4.50, mines, but are not easily obtained.

Anthracite—Receipts of anthracite continue light, due to curtailed shipments and embargoes on the Grand Trunk railroad, over which a large proportion of the shipments are moved from Buffalo. Stocks in most of the retail yards are low, with distribution, even under restrictions, proceeding in larger volume than the renewal of yard stocks. Chestnut and stove sizes are shorter than egg coal.

Lake Trade—Freer movement of coal from mines to loading docks is providing cargoes for a few more carriers. Boats are not readily obtainable, as the weather conditions of the last few weeks have caused vessels to lose time in transit, setting back some to such a degree that they may be unable to complete ore carrying contracts. On one coal cargo placed last week the shipper pays a lump amount of $5,000 for the movement of 4,000 tons of coal from a Lake Erie port to the head of Lake Superior. Other vessels were taken at 75c. and $1 a ton to deliver coal at Milwaukee and ports on Lake Michigan. On shipments to Lake Superior ports the carriers have been getting from 50c. to $1 a ton. The situation suggests a heavy all-rail movement during the winter.

CLEVELAND

Railroad embargoes and mild weather affecting prices. Lake shipments closed. Arrangements made to load coal into vessels this winter.

The principal factors affecting the Cleveland market are the mild weather and railroad embargoes, both of which have had a tendency to force prices lower, although the daily receipts have been very small. Practically every railroad at Cleveland has placed embargoes on receiving coal from connecting lines for delivery to manufacturing plants, and in addition to this, some of the roads have placed embargoes preventing the jobbers bringing coal to Cleveland consigned to themselves. These conditions have made it very difficult for a great many manufacturing plants to secure enough fuel to keep them from shutting down. In fact, several concerns were forced to have coal delivered by wagon from retail yards in order to keep their works running.

Lake coal shippers are having trouble getting coal enough to load all the vessel tonnage they have agreed to load, and some of the boats will be forced to go short of full cargoes. With the loading of coal boats now under charter it is not likely any further shipping will be done this season. However, arrangements have been made with some vessel owners to load several boats with coal this winter so that they will be ready to start up the Lakes at the opening of navigation next spring.

Following are the market prices per short ton, f.o.b. Cleveland:

	Three-quarter	Mine-run	Slack
No. 8	$4.25	$4.25	$4.00
Cambridge	4.25	4.25	4.00
Middle Dist.	4.25	4.25	4.00
Hocking	4.25	4.25	4.00
Pocahontas	....	6.50	....
Fairmont	....	....	4.00

COLUMBUS, OHIO

Lower prices due to warm weather and better car supply, but the market is generally satisfactory. Colder weather causing a stronger tone, and higher levels are anticipated.

Domestic buying is better than was the case a week ago. Dealers' stocks are light, and with a good steady trade from consumers it has been necessary to replenish their supplies. Buying is all for immediate delivery. Pocahontas is selling well, and the same is true of West Virginia varieties. Hocking lump is also firmer and Pomeroy coal has a good market. Anthracite is one of the strongest points at this time; retail prices are well maintained at former levels and dealers did not make a reduction during the period of mild weather. They are stocked up with high-priced coal and refuse to cut quotations.

Steam business is also good in every section. Manufacturing is still active and fuel requirements are heavy. Iron and steel plants are especially active at this time, while railroads are requiring a good tonnage, and confiscation of cargoes has occurred. While the steam grades showed a reduction in price, higher quotations are confidently expected soon. The lull of the past few weeks has permitted steam users to accumulate some surplus to guard against a shortage when the stress comes. Public institutions are now fairly well supplied.

Production has showed an increase during the past week, due to better car supply, especially on the Hocking Valley R.R.; the supply on that road, with the exception of the last day of the week, was about 85 per cent. On other lines there is still a shortage, which is causing considerable trouble. Another feature is the congestion at many of the junction points, which is holding up shipments. Lack of motive power is now being felt on all sides.

The Lake trade is practically over and the season as a whole was a prosperous one for Ohio and West Virginia shippers. There is a shortage of coal in the Northwest and considerable coal will be shipped all-rail during the winter months. Indications point to an active Lake season in 1917.

Prices on short tons f.o.b. mines are as follows:

	Hocking	Pomeroy	Eastern Ohio
Rescreened lump	$4.00	$4.00	....
Inch and a quarter	4.00	4.00	$4.00
Three-quarter inch	3.50	4.00	3.50
Nut	3.50	3.50	3.50
Egg	3.50	3.50	....
Mine run	3.00	3.00	3.25
Nut, pea and slack	2.50	2.75	3.00
Coarse slack	2.50	2.75	3.00

CINCINNATI

Colder weather starts an increased demand for domestic, with correspondingly higher prices. Steam market strong and active.

The unseasonably mild weather ended last Saturday with a decided drop to about freezing, accompanied by snow, and retail dealers reported the usual rush of emergency orders from consumers who never buy until compelled to do so. This was immediately reflected in a heavy call upon shippers and wholesalers for prepared sizes, giving this side of the market a stimulus which was in some ways needed. The difficulty in keeping the market supplied has been very largely due to the car shortage, but it is also true that the limited demand for prepared coal has kept down the production of screenings. This, with the very heavy demand for steam fuel, has brought prices on the steam grades to their present high levels. Bituminous nut and slack from the West Virginia districts, is active at $3@3.25 f.o.b. mines, and eastern Kentucky coals of similar grade are maintained at the same levels. Pocahontas, as usual, is virtually off the market, consumers complaining that they are forced to disregard city ordinances regarding smoke on account of their inability to get smokeless fuel. Mine-run has been to some extent forced upon the market by the scarcity of screenings, at prices below nut and slack, but with better domestic demand this condition should cease.

LOUISVILLE

Colder weather and prospective decline in production during holidays stiffen market. Car supply better although apprehension expressed as to shortages later.

Arrival of more normal temperatures and the consequent increase in the demand, together with the likelihood of the usual holiday let-down in the mining fields has had a tendency to stiffen the Kentucky coal market. Car supplies during the week have been much better than heretofore, some of the operations reporting a 70% supply. As yet, however, leading operators are shipping the bulk of their output to contract customers on whose requirements they fell far behind during the recent car shortage. There is some apprehension expressed as to likelihood of recurrence of the car shortage in the course of the next two weeks, and it is feared that January will find conditions as bad as they were some weeks ago.

Eastern Kentucky coals, f.o.b. the mines, are quoted: Block, $4.25@4.50; egg, $3.60@3.75; mine-run, $3.25@3.50, and nut and slack, $3.25@3.35.

Western Kentucky operators note little change and find the market continuing firm. Prices, f.o.b. the mines, are: Lump, $2.50@3; mine-run, $2.25@3; nut and slack, $2; pea and slack, $1.25@1.50.

BIRMINGHAM, ALA.

Demand for steam and domestic grades slightly easier, with no recession in prices as yet. Car supply gradually improving, but is still restricting production considerably.

The local coal market is not quite as strong as a week ago, but the volume of business offered is satisfactory and conditions have not eased up sufficiently to affect quotations. The slackening in demand is attributed to the continued warm weather. Domestic dealers are loath to replenish their stocks too lavishly on account of the stiff prices prevailing and the inactivity in the retail market. We quote the following prices per net ton f.o.b. mines on steam coal:

	Mine-Run	Washed Mine-Run	Washed Nut
Big Seam	$3.50@4.00	$3.75@4.25	$3.75@4.25
Carbon Hill	4.00	4.00	4.00
Pratt	4.00@4.25	.....	.....
Black Creek	4.00@4.25	4.00@4.50	4.50
Cahaba	4.00@4.25	4.00@4.50	4.50

Domestic grades are quoted from $4 to $5 per net ton, f.o.b. mines.

The car supply is slowly improving, but is far from being adequate to enable the mines to operate on a schedule necessary to produce a sufficient supply of coal for their customers.

Coke

CONNELLSVILLE

Slightly better car supplies but spot coke loses no strength. Second-half furnace coke contract at $5. Production and shipments increased.

Despite the fact that car supplies in the Connellsville region were better all week than the average of the two preceding weeks the spot furnace coke market is a trifle stronger. There has been talk of $7.50 coke but there have been several sales this week at $8, and even $8.25 is said to have been done in one or two instances. The total turnover has been light, as very few operators ever have any surplus coke after they have filled their contract obligations, and furnacemen having contracts are making every effort to see that they are shipped as much coal under their contracts as can be shipped.

Car supplies appear to be only fair this week. There has been no really bad winter weather thus far and when such weather comes a regular famine will doubtless be precipitated. There is an embargo on freight arising on the Pennsylvania lines for shipment west of Pittsburgh, but coal and coke are excluded from the rule.

There is some negotiating on contract coke but not a great deal. It is understood that there is one inquiry in the market for first half, with higher than $4 quoted, while report has it that a contract for second half has been closed at $5.

Foundry coke is at about the same level that has obtained for some time past. We now quote: Spot furnace, $7.50@8.25; contract, $4@5; spot foundry, $9@10; contract, $5.50@6.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Dec. 2 at 419,377 tons, an increase of 11,209 tons, and shipments at 412,410 tons, an increase of 11,179 tons.

Buffalo—Heavy demand and scarcity of cars and labor keeps the prices of coke strong. It is difficult to keep a supply anywhere. The comparative slackness of the coal market would open all the ovens if they could be manned fully and the product shipped. Quotations are strong at $10.60 for best Connellsville foundry or furnace and $9 for high-sulphur and stock coke, all based on a $1.85 freight.

Chicago—The coke trade is simply a repetition of what has been reported for several weeks past, no change distinguishing the general aspect of things. Limited spot sales command fancy premiums. Shippers are still far behind orders and make no progress in catching up. Furnace and foundry coke is easily sold at $9 per ton. Nominal prices per net ton, f.o.b. cars Chicago, are approximately as follows:

Connellsville	$9.00@10.00
Wise County	9.00@10.50
By-Product Foundry	9.50@10.00
By-Product Domestic	8.50@ 9.50
Gas House	7.50@ 8.25

St. Louis—Local gas coke is off of the market excepting for contracts. The local plant has notified the trade that they are sold up on the open market until Apr. 1 or later. Some byproduct is still offered but the tonnage is small. The demand for gas and byproduct for domestic use is exceptionally good. Byproduct chestnut size from the Birmingham district is moving through St. Louis for points beyond, replacing anthracite chestnut at a price per net ton f.o.b. Birmingham of $5. The jobber is quoting at from 50c. to $1 above this.

Birmingham—Spot foundry coke has sold during the past week at $8.50 per net ton, f.o.b. ovens, and is now being quoted at $10. The supply of free coke continues to be scarce, with inquiries on the increase. Furnace coke is not available for the spot market and is in strong demand from foreign sources as well as from furnace interests in the district. It it likely that more of the antiquated bee-hive ovens, which have been out of commission for years, will have to be repaired and placed in commission to meet the exigencies of the market.

Middle Western

GENERAL REVIEW

Prices a trifle easier, but car shortage intensified. Steam sizes threaten to reach higher prices. Eastern coals very strong.

Despite endeavors on the part of buyers to break prices, the market has shown strong resistance, and toward the close of the week the arrival of much colder weather stimulated quotations, which were showing a tendency to become easier. The car supply is growing tighter.

While some relaxation in domestic buying developed during the middle of the week, the steam demand shows no letup, and unfilled orders for steam grades at the mines are ahead of production for many weeks to come. Extreme high figures have not prevailed on choice Indiana and Illinois domestic spot coal this week, but the general market is technically very strong. A great many buyers have withdrawn heavy orders, hoping for relief, and in some districts this caused the coarse sizes to decline nearly 50c. per ton.

The Northwestern market is in a serious predicament, the shortage amounting to nearly 4,000,000 tons. The dock supplies will be exhausted very shortly, and are even now beginning to make shipments only to points where requirements are most urgent. Indiana and Illinois mines have increased their shipments to Northwestern territory very substantially, but real winter weather will add to the difficulties of the situation.

There is also a dearth of coal supplies in the Southern States, particularly the Southwestern territory, due to shortage of river coals, and increasing calls have been made on Illinois operators this week. Steam users having contracts are urging the mines to ship maximum quantities covered by their obligations, and while the operators have been making every effort to take care of their regular customers, the car supply has not permitted them to do so. Screenings seem to become scarcer and scarcer and have been readily sold as high as $4 per ton this week.

CHICAGO

Domestic prices moderately firm and steam sizes very strong. Eastern coals at high figures, with limited supply.

Notwithstanding an easing of prices in other sections, the quotations for Franklin County production have been very firm this week, screenings being particularly stronger, though orders for domestic sizes have declined slightly. Large users of steam sizes have been urgent in their demands for maximum contract tonnage. The car supply has been worse. Operating time in the Franklin County field has averaged about 65 per cent. this week

Orders at the Williamson County mines are still far in excess of production, with all prices at a high level. The Franklin County mines produced 1,050,000 tons in November, which is 150,000 tons more than the same month of last year. No free coal is being shipped from the Saline County field, all production being applied on contracts.

In central Illinois spot domestic sizes have yielded to around $3.50, while steam sizes have readily brought from $3 to $3.25, with the demand very strong. Domestic coals from Fulton and Peoria Counties have been somewhat softer, but steam sizes are still very strong.

Strikes at the Indiana mines this week, particularly in the Clinton district, have been the source of considerable trouble, and the trouble seems to be spreading. The early part of the week prices for Indiana domestic sizes were easier, but toward the close colder weather and the possibility of reduced production brought quotations back to the previous high level. Car supply shows no improvement, and such mines as have been working have averaged about half time. The amount of free coal shipped from the Indiana mines is comparatively small and the operators are strenuously making efforts to fill the contracts. Domestic prices have averaged from $3.25 to $3.50, with screenings strong at the $3 mark.

Continued strength distinguishes the market for Pocahontas and New River coal. While buying has not been so strong in the West, the Eastern

pressure adds strength to the situation here. Lump and egg is averaging $5, while mine-run brings $4.50. Spot tonnage of mine-run is more frequent than prepared sizes No great quantity of Pennsylvania smokeless is offered in this market.

Quotations in the Chicago market are as follows per net ton f.o.b. cars at mines:

	Springfield	Fulton & Peoria Cos.	Clinton & Sullivan Cos.	Green & Knox Cos.	Carterville
Domestic lump	$3.00@3.50	$3.50@4.00	$3.25@3.75	$3.00@3.25	$4.00@4.50
Steam lump	3.00@3.25	3.25@3.75	3.00@3.50	.....	.....
Egg	3.00@3.25	3.25@3.75	3.25@3.50	3.00@3.25	3.75@4.50
Nut	3.00@3.25	3.00@3.50	3.00@3.25	3.00@3.25	.....
Mine-run	3.00@3.25	3.00@3.25	3.00@3.50	2.75@3.00	3.75@4.50
Screenings	3.00@3.25	2.75@3.25	3.00@3.25	3.00@3.25	3.00@3.50

	Wlmson. & Frankln. Cos.	Saline & Harris-burg	Poca. & W. Va. Smokeless	Penna. Smokeless	Eastern Kentucky
Lump	$3.50@4.00	$3.50@4.00	$4.75@5.00	$4.50@5.00	$3.25@4.25
Egg	3.50@4.00	3.50@4.00	4.75@5.00	4.50@5.00	3.25@4.25
Nut	.....	.....	.....	.....	2.50@4.00
No. 1 nut	3.50@4.00	.....	.....	.....	.....
No. 2 nut	3.50@3.75	.....	.....	.....	.....
No. 3 nut	3.00@3.50	.....	.....	.....	.....
No. 1 washed	.....	3.50@4.00	.....	.....	.....
No. 2 washed	.....	3.25@3.75	.....	.....	.....
Mine-run	3.25@3.50	3.25@3.50	4.00@4.50	4.00@4.50	3.00@3.50
Screenings	3.25@3.50	3.25@3.50	.....	.....	.....

Hocking Lump $3.50@3.75. Splint Lump $3.50@3.75.

Little Kentucky coal seems to be moving north of the Ohio River, and there is a difference of about $1 per ton in prevailing quotations on high- and low-grade domestic sizes. Spot Splint lump has been uneven in price, and Hocking, which was easier during the forepart of the week, became much stronger toward the close, being quoted as high as $4 for domestic lump.

The anthracite situation is very strong. Reserve stocks are low, and agencies are solicited by mail, telegraph and telephone for urgent shipment. Tonnage is applied in a piecemeal way. The supply of anthracite on the docks is about exhausted and future shipments will be very scarce owing to cars not being available and slow deliveries by rail.

KANSAS CITY

The first touch of real winter weather in Kansas City did not bring the urgent call for coal that had been predicted, and dealers are wondering what the real outcome of the recent apparent severe shortage will be. Prices on domestic coal are high, but holding steady. Charges and counter charges are being made with reference to operators, dealers, railroads and jobbers, but the fact stands that apparently everybody who needs coal is getting it. In steam coal, there has been more serious approach to distress, and reports are heard of users paying as high as $4.50 at the mine for 10-car lots of mill coal, to meet emergencies.

ST. LOUIS

Warm weather causes a general decline in prices. A plentiful supply of cars. Some storage coal being accumulated in anticipation of railroad trouble Jan. 1. Steam sizes strongest.

Warm weather and an opinion by the majority of buyers that the market could not hold its record prices brought a general decline this week, and the failure of country business to keep up to what it has been, caused a surplus of coal that forced prices down.

There has been a fairly good car supply, about a 65% to 75% on all roads, and this has enabled the operator to catch up with his contracts, and left considerable free coal. The operators are moving their tonnage at a minimum price from the high-grade field at $3.75 mines for domestic sizes, and $3.25 for steam sizes, but the jobbers who were largely responsible a few weeks ago for the rapid advance in price are now the cause for the decline. A lot of coal bought at $2 and under is moving in now without any demand to speak of, and with the warm weather, this has brought a demoralization that is going to be hard to overcome.

The present price of $4 on Williamson and Franklin County domestic sizes is being maintained. A large tonnage of mine-run from the high-grade field is moving to New Orleans and the South for storage purposes and also some to other sections. This brought a minimum of $3 at the mines, and in some instances better. In the Standard field a large tonnage of mine-run moved this week to New Orleans that netted the operator from $2 to $2.25. Northern and western railroads are buying mine-run heavily.

At East St. Louis the short line coal roads have trainloads of coal on track, and all the retail yards in St. Louis have more coal than they can take care of. Steam plants, however, are still paying good prices for the steam sizes, and the demand for this grade continues throughout the Middle West.

Coal for outside shipment still brings a better price than at St. Louis proper. A strange condition prevails as regards to the country trade. Jobbers in Memphis are quoting in the St. Louis territory a price of 50c. under the Chicago and St. Louis shippers on the same coals from the same mines. This is causing considerable confusion in the country.

The unusual conditions that have existed for several weeks past have put several dealers out of business by forcing them to buy their coal from their competitors. Some operating companies with retail yards in St. Louis neglected both their domestic and their dealer trade to ship coal to territories that never bought Illinois coal before and this has caused untold hardships on the small dealer.

The retail price of coal delivered to St. Louis for Williamson and Franklin County is $4.50@4.75 per net ton; Mt. Olive is $4.25@4.50, and Standard is $4@4.25. Independent dealers would have prices anywhere from 75c. to $2.25 higher than these prices were it not for the policy adopted by the Polar Wave Co. in keeping the market within reason.

The receipts of anthracite have been better this week than for several weeks past, and a small tonnage of smokeless—better than for sometime past—moved in.

The prevailing prices for St. Louis proper f.o.b. mines per short ton are:

	Williamson and Franklin Co.	Mt. Olive and Staunton	Standard
6-in. lump	$3.00@3.25	$2.60	$2.25@2.50
3x6-in. egg	3.00@3.25	2.50	2.25@2.50
2x3-in. nut	3.00@3.25	2.50	2.25@2.50
No. 2 nut	3.00@3.25	*	2.25@2.50
No. 3 nut	3.00@3.25	*	2.25
No. 4 nut	2.75@3.00	*	2.25
No. 5 nut	2.75	*	2.00
2-in. screenings	2.75	*	2.00@2.25
2-in. lump	.....	.....	2.00@2.25
3-in. lump	.....	2.50	.....
Steam egg	3.00	.....	2.00@2.25
Mine-run	2.75@3.00	*	2.00@2.25
Washed			
No. 1	3.00@3.25	3.00@3.25	3.00@3.25
No. 2	3.00@3.25	3.00@3.25	.....
No. 3	3.00@3.25	3.00@3.25	.....
No. 4	3.00	2.50@2.75	2.50
No. 5	2.75	2.75	2.00@2.25

*No tonnage sold in St. Louis on open market; other markets bringing as much as $1 over what local market would bring.

General Statistics

ANTHRACITE SHIPMENTS

The shipments of anthracite for November amounted to 5,992,997 tons, an increase of 122,793 tons as compared with the preceding month, when they amounted to 5,870,204 tons, but a decrease of 501,445 tons as compared with November, 1915. The total shipments for the year ended with Nov. 30, amounted to 61,793,617 tons, as compared with 61,734,389 tons for the eleven months in 1915.

The record month for shipments from the anthracite region was in October, 1915, when 6,683,007 tons were sent to market. Notwithstanding the serious shortage of labor in the region, amounting in some sections to as much as 25%, the shipments last month were almost 90% of this maximum, showing that every ton it is possible to produce is being sent forward.

Coal on hand at Tidewater shipping ports, Nov. 30, was 167,679 tons as compared with 270,799 tons on Oct. 31.

EXPORTS BY DISTRICTS

Exports of domestic coal and coke from the United States and bunker coal laden on vessels engaged in the foreign trade, at the specified districts, during the month of October, 1916, were as follows:

Districts	Anthracite	Bituminous	Coke
Maine and New Hampshire	189	.....	.....
Vermont	1,130	3,144	24
Massachusetts	72	4	.....
St. Lawrence	90,554	108,238	1,588
Rochester	48,428	135,442	392
Buffalo	138,414	151,328	33,005
New York	36,235	8,427	2,521
Philadelphia	4,455	63,477	409
Maryland	.....	59,530	7,563
Virginia	.....	425,402	2,078
South Carolina	.....	4,170	.....
Georgia	.....	201	.....
Mobile	.....	128	.....
Florida	4	.....	.....
New Orleans	15	1,198	37
Laredo	.....	2,178	150
El Paso	30	6,390	.....
Eagle Pass	.....	1,147	.....
Arizona	.....	5,791	13,965
Southern California	31	7	.....
San Francisco	4	20	138
Washington	69	337	4,831
Alaska	.....	'	.....
Montana and Idaho	.....	46	.....
Dakota	654	2,563	786
Duluth and Superior	363	6,030	201
Michigan	2,976	54,074	8,211
Ohio	19,585	605,191	7,590
Total	343,208	1,644,464	83,489

Bunker Coal	Tons
Maryland	36,366
New York	260,608
Philadelphia	33,579
Virginia	177,562

NORFOLK & WESTERN

Destination of shipments over this road for October and the first ten months of last year and this year were as follows, in short tons:

	October		Ten Months	
Coal	1915	1916	1915	1916
Tidewater				
Foreign	361,883	268,293	3,426,479	2,990,355
Coa'w'se	234,623	222,139	2,673,915	2,955,696
Dom'tic	2,467,395	2,452,138	18,597,536	23,089,538
Coke				
Foreign	4,511	2,006	27,591	44,786
Domestic	85,618	157,911	730,816	1,650,837
Total	3,154,030	3,102,487	25,456,337	30,731,212

LAKE SHIPMENTS

Shipments through the Sault Ste. Marie Canals for September and the eight months of this year and last year compare as follows:

	September		Eight Months	
	1915	1916	1915	1916
Hard	233,708	188,070	1,942,630	2,076,901
Soft	1,343,248	1,021,060	11,092,594	13,508,955

I. C. C. Decisions

No. 8157—Middle West Coal Co. vs. Chesapeake & Ohio Ry. Submitted Dec. 18, 1915. Decided Nov. 9, 1916.

1. Demurrage charges collected on a carload of coal detained at Churubusco, Ind., because of the failure of the carriers to effect the reconsignment of the shipment to Chicago, Ill., as ordered by the shipper, found to have been assessed without tariff authority and therefore to have been illegal. Defendants directed to refund the illegal charges with interest.

2. Conference ruling No. 220 (f) construed.

No. 8326. Castner, Curran & Bullitt vs. Pennsylvania Co. Submitted Feb. 3, 1916. Decided Nov. 10, 1916.

Defendant's demurrage rules applicable at Sandusky, Ohio, on carloads of lake cargo coal made no provision for the cancellation of charges which had accrued by reason of weather interference. Allegation that charges collected thereunder were unreasonable and unjustly discriminatory not sustained. Complaint dismissed.

	Domestic Sizes				Total			
	November		Eleven Months		November		Eleven Months	
	1916	1915	1916	1915	1916	1915	1916	1915
Phila. & Reading	1,002,687	1,002,455	10,122,273	9,022,347	1,200,814	1,163,851	11,802,088	10,358,940
Lehigh Valley	953,810	1,049,374	9,806,007	10,654,288	1,082,453	1,190,103	11,092,071	11,904,105
Cen. R.R. of N. J.	497,107	599,415	5,358,509	5,948,842	621,584	762,140	6,535,290	7,294,834
D. L. & W. R.R.	829,906	799,234	8,228,098	7,238,874	979,607	971,389	9,684,935	8,651,189
Dela. & Hud. Co.	524,581	568,726	5,434,235	6,241,002	628,239	694,386	6,503,423	7,365,989
Pennsylvania	382,169	528,831	4,687,499	4,655,732	438,869	616,190	5,392,423	5,487,151
Erie R.R.	580,988	593,131	6,125,568	6,077,511	674,261	696,890	7,083,899	7,221,557
N. Y., O. & W.	141,004	176,798	1,545,669	1,695,170	162,257	202,266	1,798,023	1,898,453
Lehigh & N. E. R.R.	214,639	.....	1,951,705	.....	280,149	.....	2,378,635	.....
Total	5,126,891	176,380	53,259,563	1,377,949	6,068,233	197,227	62,270,787	1,552,171
* Deduction	27,475	.	278,659		75,236		477,170	
Total	5,099,416	5,494,344	52,980,904	52,911,715	5,992,997	6,494,442	61,793,617	61,734,389

* Deduction: Tonnage reported by both C. R.R. of N. J. and L. & N. E. R.R.